Is It All in Your Head?

Personality in the Context of Intergenerational Reproduction of Inequality

Susanne Schührer

Thesis submitted for assessment with a view to
obtaining the degree of Doctor of Political and Social Sciences
of the European University Institute

Florence, 27 November 2017

European University Institute
Department of Political and Social Sciences

Is It All in Your Head?

Personality in the Context of Intergenerational Reproduction of Inequality

Susanne Schührer

Thesis submitted for assessment with a view to
obtaining the degree of Doctor of Political and Social Sciences
of the European University Institute

Examining Board

Prof. Dr. Dr. h.c. Hans-Peter Blossfeld, European University Institute
Prof. Diego Gambetta, Ph.D., European University Institute
Prof. Dr. Sabine Weinert, Otto-Friedrich-University Bamberg
Prof. Michelle Jackson, Ph.D., Stanford University

Researcher declaration to accompany the submission of written work
Department of Political and Social Sciences - Doctoral Programme

I Susanne Schührer certify that I am the author of the work Is It All in Your Head? - Personality in the Context of Intergenerational Reproduction of Inequality I have presented for examination for the Ph.D. at the European University Institute. I also certify that this is solely my own original work, other than where I have clearly indicated, in this declaration and in the thesis, that it is the work of others.

I warrant that I have obtained all the permissions required for using any material from other copyrighted publications.

I certify that this work complies with the Code of Ethics in Academic Research issued by the European University Institute (IUE 332/2/10 (CA 297).

I declare that this work consists of 52,917 words.

This thesis has been corrected for linguistic and stylistic errors. I certify that I have checked and approved all language corrections, and that these have not affected the content of this work.

Signature and date:

Nuremberg, 27 October, 2017

For Martin Scharmach (1985–2011)

I wish this was your thesis finished.

This work is dedicated to anyone with a disability or chronic sickness and all of their friends and family to encourage equality.

Acknowledgements

First and foremost, I would like to thank my supervisor Hans-Peter Blossfeld for his support and unconditional commitment to me and the eduLIFE project. He created and led us through this great opportunity and I could not have wished for a better start into my professional life. I would also like to thank the jury members Prof. Diego Gambetta, Prof. Sabine Weinert, and Prof. Michelle Jackson for their insightful and helpful feedback and suggestions. I feel very honoured to have such distinguished researchers on my examination board. I would like to thank all of my dear colleagues of eduLIFE: Sandra Buchholz, Fabrizio Borchi, Sandra Bchler, Johanna Drich, Elina Kilpi-Jakonen, Yuliya Kosyakoya, Nevena Kulic, Jan Skopek, Moris Triventi, Daniela Vono de Vilhena, and Susanne Wahler; We had a motivating, friendly and respectful working environment which we realized a great project together. Thank you to Alessandra Minello, the best office mate you could possibly wish for. Dear Alina, you left us far too early – you will always be in our hearts!

A special thank you to my external collaborators on the project, especially David Bills and Felix Weiss, who helped me grow so much as a researcher. To Gabriella Unger, Adele Battestini and Martina Selmi, who did all of the work in the background so perfectly that we sometimes didnt even realize how much work there has been. Your great support allowed us to focus on our research thank you for that! Also, I would like to thank Fatma Sayed for her advice on organizational matters and Erika Blossfeld for being there and always having a smile and a friendly word for us in any situation.

My time as a PhD student was accompanied by losses and sicknesses. There are no words in this world that can describe my deep gratitude for my family, my parents, my sister Sabine and David. I would not know where I would be today without all of their unconditional love and support. We went through these hardships together and I am eternally blessed to have you!

Thank you to all of my friends, for their patience and advise, the chats, the laughs, the drinks, and board games. For taking me by the hand when I was not able to walk by myself. Thank you to Patricia, Janto, Dani and Johanna, amazing friends that grew out of simple work relationships. To Katharina, who always had a good advice and brought me back to reason whenever it was needed. To Svenja, my constant companion thank you for being by my side! To Marco for bearing my moods patiently. To Evelyn, Jan and Leander, three brilliant researchers and writers and even more brilliant friends.

Without you, I would not have made it!

Abstract

This thesis brings together psychological and sociological research approaches to examine the role of personality in the reproduction of educational and labour market inequality. The first research question examines the influence of personality on educational and labour market outcomes. The second research question relates to the extent to which differences in personalities of children and parents can explain the reproduction of educational inequality. The third research question inquires to what extent supportive parenting influences the development of favourable or unfavourable personality traits.

The thesis employs an empirical approach and uses quantitative methods. The German Socio-Economic Panel (GSOEP) and its sub-sample from the Youth Questionnaire are used to conduct the analyses. To capture personality, the Big Five and Locus of Control are applied. The educational outcomes investigated are maths grades and school placement for 17-year-old, as well as years of education and income for adults. The study uses data on education, socio-economic background, and personality measures spanning two generations: the parents and the children.

With respect to the first research question, results indicate positive effects of Openness to Experience, Conscientiousness and Locus of Control, and a negative effect of Neuroticism on school placement. Effects of personality on grades were found to a lesser degree. In auto-regressive cross-lagged models, personality and income have reciprocal effects over a time span of 10 years, where different personality traits show different patterns over time. Regarding the second research question, results indicate that personality does not explain the effect of parental education on children's school outcomes, however it is found post-hoc, that parents' personality traits mediate the effect of socio-economic status measured with the Erikson-Goldthorpe class scheme. Results for the third research question suggest, that children who report a high degree of supportive parenting show a stronger development of beneficial personality traits.

Keywords: *social inequality, education, labour market, personality, socialisation, structural equation modelling*

Contents

List of Figures

List of Tables

1 Introduction

Research Questions

The purpose of this thesis is to examine the role of personality in the context of intergenerational reproduction of inequality and in particular with regard to educational and labour market outcomes. This is investigated through three main research questions. The first research question examines the influence of personality on education outcomes. As research in this area has been limited, an exploratory approach is used to investigate whether horizontal differentiation in personality affects vertical inequalities with regard to education and income.

The second research question examines the extent to which differences in personalities of children and parents can explain the reproduction of education and labour outcome inequality across different educational backgrounds over two generations. This question considers the relative influence that fathers and mothers have on their children's educational outcomes. It also considers whether this relation changes when the personality of the parents or the personality of the children is taken into account.

The third research question investigates to what extent supportive parenting affects the development of favourable or unfavourable personality traits.

Research Motivation

The research questions investigated in this thesis draw on and bring together three different research traditions: The role of personality on educational and labour market outcomes, intergenerational reproduction of inequality, and the transfer of personality over generations. Studies on these topics are mainly covered by sociological and psy-

chological views. As presented in the following paragraphs, neither discipline combines personality, socio-economic background and long-term education and labour market outcomes. This thesis aims to add to the existing body of inequality literature on one hand by combining state of the art sociological and psychological concepts and methods, on the other hand it brings together educational and income inequality with personality, using quantitative methods and longitudinal multi-generational data.

A main driver of inequality has been shown to be education and the labour market positioning. The labour market in the post-industrial society considers individuals' positioning in the social ranking based on income, prestige, and other factors such as supervisory responsibilities. Education is a preceding factor in obtaining a good labour market position. Higher education is not only associated with better job outcomes but also with other important factors such as better health (Adler et al., 1994; Leopold and Engelhardt, 2013).

Various researchers have, however, found consistent evidence that modern Western societies do not equal an ideal type of meritocracy, where educational and labour market outcomes should be based on demonstrated skills and abilities. They identified a number of factors that explain persisting and even growing inequality in educational and labour market outcomes (e.g. Lucas, 2001; Bernardi, 2012; Blossfeld et al., 2017b; Shavit and Blossfeld, 1993, just to name a few). A crucial role is attributed to status stability that is maintained across generations and within families. Researchers found, that children from disadvantaged backgrounds started school already in a worse position than their peers from more advantaged backgrounds. Those advantages accumulate over the life course and lead to greater status differences in later life. This effect of cumulative advantage is commonly labelled as 'Matthew effect' (Merton, 1968). Furthermore, well-off people seem to be able to withstand external shocks, such as the educational expansion in the last century, and to stay solidly on the top. In educational research, this has been described as Effectively Maintained Inequality (Lucas, 2001).

Newer research indicates, that socio-economic background is not the only explanation for differences in educational and labour market outcomes. Instead, other less visible or

tangible elements were also able to partially explain these differences, such as cognitive or noncognitive skills (for a comprehensive overview see Borghans et al., 2008a). A large body of literature has considered the influence of cognitive skills on skill formation and learning outcomes while neglecting noncognitive outcomes. In the disciplines of micro-sociological or economics research, researchers often prefer objective measures to show causes and effects of inequality, to refer to the example above, where the subject of study in university is an easy-to-measure, objective variable.

Within studies dedicated to this topic, references to noncognitive skills as possible explanatory factors are commonly found, however lacking closer definitions and mechanisms and leaving open how these noncognitive skills would influence education and labour market outcomes (e.g. Heckman et al., 2010). The importance of noncognitive skills, and in particular personality, in research about the reproduction of educational inequality has been highlighted by previous researchers, including Farkas (2003), who argued that personality can be seen as cause of class specific ideas and behavioural patterns. But in these as well as in many other studies dedicated to the reproduction of inequality those 'noncognitive skills or other latent factors' remain unexplained, a 'black box' (Jackson et al., 2007, p. 224). Carneiro and Heckman (2003) commented on this problem: 'Current analyses of skill formation focus too much on cognitive ability and too little on noncognitive ability in evaluating human capital intervention' (p. 10).

In contrast to sociological literature, psychologists have done extended research on personality and found major differences across individuals. People differ considerably in how they react in social situations or in career choices due to character predispositions. However, in the past psychologists did not focus on the distribution of personality over socio-economic backgrounds.

A common strategy of psychologists tries to show differences in behaviour in real life by randomised experimental designs, with different degrees of success in terms of external validity. However, the distribution over the social strata cannot be randomised. Also, research questions regarding social stratification usually do not fall into the field of classical psychology and social psychology. Many research questions in this field aim to find

specific effects in individual behaviour, differing by biological traits, such as gender, but to a lesser extent by socio-economic background, in which personality affects cognitive outcomes under very specific circumstances or in short term outcomes, however not with effects on social structure (e.g. Carneiro and Heckman, 2003; Cunha and Heckman, 2008; Royer et al., 1999). The few studies which do look on more general outcomes, such as the American General Education Development Test (GED) do not set it into context with social inequality (Heckman and Rubinstein, 2001). Those which do, are very careful in the generalisation on social inequality. Heckman and Mosso (2014), for example, summarise their own findings in the context of social mobility as to 'show near-parallelism [...] across children of parents from different socio-economic backgrounds' (p. 4). Furthermore, those studies are not including personality as an explanatory factor.

Damian et al. (2015) perfectly summarise the research gap: 'The psychological literature on status attainment tends to focus on personality trait and cognitive ability predictors and correlates [...]. In contrast, sociological literature on status attainment tends to focus on parental social class predictors and correlates [...] Although these two lines of research have developed in parallel, there is very little research, to date, bridging the two traditions' (p. 474). This is where sociologists and survey research can contribute to personality research. This dissertation takes an interdisciplinary approach, combining relevant aspects of both psychology and sociology to examine the complex relationship between the reproduction of inequality in education and labour market outcomes, and personality. This work adds to the existing body of inequality literature by combining state of the art sociological and psychological concepts and methods. It brings together educational and income inequality with personality and parental background, using empirical methods and longitudinal multi-generational data.

The Scope of this Thesis

This thesis first provides an outline on the definition and history of personality measures to lead to a data section, followed by three empirical studies on the relationship of personality and social inequality, finishing with a discussion on limitations of this study

and research outlooks. Chapter 2 provides an overview of the history of personality research, primarily on the personality measures under research, two of the most widely used personality measures: The NEO Personality Inventory (PI) developed by Costa and McCrae (1985), commonly known as the 'Big Five' and 'Locus of Control', a measure for control attribution (Rotter, 1954, 1966). In addition, it discusses how personality fits into the above-mentioned discussion about 'noncognitive skills' and how personality as an abstract construct is commonly operationalised and measured.

Chapter 3 presents the data and the sample used. I employ data of a rarely used sub-sample of the German Socio-economic Panel, the longest running household panel in Germany, containing children of the panel households at age 17, the so-called 'Youth Questionnaire'. The data structure includes information on three generations, two of which contain personality measures directly asked of the participants. This unique combination of longitudinal information and the multi-generational structure of the data, including qualitatively high personality measures, allows the researcher to gain new knowledge in the field of educational and labour market research. The chapter then contains information on the operationalisation and details on the variables of choice.

The first study, chapter 4, aims to answer the first above mentioned research question on how personality affects educational and labour market outcomes and additionally examines the reciprocal effects of personality and labour market outcomes. Structural equation modelling is applied to adequately model the latent nature of personality variables. This study has a more explorative character, as predicting theories on long-term educational and labour market outcomes are not available for each personality trait.

Chapter 5 contains the second study that examines the second research question, the extent to which differences in personalities of children and parents can explain the reproduction of education and labour outcome inequality within socio-economic groups over two generations. The theoretical approach follows a concept of Boudon (1974), where 'primary effects' refer to class specific distribution of academic performance and 'secondary effects' refer to 'class specific preferences'. It is examined whether and to what extent personality contributes to that. To integrate personality effects into this approach,

I add the aspect of personality traits as action guiding preferences in following an idea by Rotter (1990). The method of choice is testing mediating effects of personality on the effect of parental education on children's educational outcomes in multivariate regression models.

Chapter 6 presents the third study, which investigates to what extent supportive parenting contributes to the development of favourable or unfavourable personality traits and how educational outcomes are related to this. This chapter tries to make visible, how predictors of educational success indirectly contribute to the reproduction of educational inequality. This study, too, uses structural equation modelling structural equation modelling to analyse supportive parenting as a latent variable.

The thesis closes with the discussion in chapter 7, summarising the main results as well as describing the shortcomings of this study, alternative measures for personality and an outlook for future research.

2 Personality as a Noncognitive Skill

The term 'noncognitive skills' is commonly found in the context of unexplained variance in multivariate models, in contrast to or in comparison with cognitive skills without further explanation. This chapter summarises previous attempts of defining noncognitive skills and explains how the central variable of this study, personality, is embedded in this context. After this, the chapter focuses more on research on personality. Firstly, a brief overview on the history of personality research in general is given, as well as how the concept of personality is to be operationalised and measured. Secondly, the 'Big Five' (section 2.3) and 'Locus of Control' (section 2.4), the two concepts used in this study, are introduced. These two sections present the Big Five and Locus of Control in a research history context and link them to similar concepts in the field of personality research.

In terms of wording, I agree with a quote by Farkas (2003, p. 542) on the term 'noncognitive skills': 'However, the authors [referring to Bowles and Gintis (1976); note from the author] use this phrase as a catch-all because they wish to focus on variables other than those measured by test scores. Because essentially all subsequent researchers have maintained this nomenclature, I shall too.' From this quote also, the term 'cognitive skills' derives, that is used when referring to the sum of cognitive abilities directly leading to performance in any form of intelligence and test scores in an academic context. 'Personality' in contrast is used for the whole of personality traits in a person and understood as a special case of noncognitive skill. 'Personality traits' are different concepts of a person's intrinsic attributes that motivate acting after certain preferences ('action guiding preferences'), as explained in section 2.1 and more specifically with reference to Rotter (1954) in section 2.4. 'Personality styles' are practically equivalent to what is termed 'personal-

ity traits' in other areas of research. The terms 'styles' and 'traits' do not describe the same thing, but in the case of personality it can be found interchangeable across different areas of literature. In other domains styles refer to active processes, for instance thinking styles (Sternberg, 1994; Zhang, 2002), parenting styles (Pettit et al., 1997) or learning styles (Blickle, 1996), while 'traits' are usually described to attributes or characteristics. In this work the term 'personality traits' is used. For example, the five dimensions of the Big Five (Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) will be referred to as five different personality traits.

The general term 'skills' has been described by Winterton et al. (2005, p. 12) as 'goal directed, well-organised behaviour that is acquired through practice and performed with economy of effort.' They identify four major points of this definition. First, skills are developed by practice over time; second, the goal direction to external demands; third, that it is a pattern of behavioural structures; and fourth, skills help to diminish cognitive demands. Skills can be divided into cognitive and noncognitive skills. Cognitive skills concentrate on abilities such as reading, mathematics and sciences as well as meta-cognition (Haendel et al., 2013). Noncognitive skills, however, are very complex and there are several perspectives on the different dimensions of noncognitive skills; personality would be just one of them. In the following, I would like to discuss the broader context in which personality research is embedded.

Although there is a growing amount of literature that deals with noncognitive skills, there is a lack of definition of noncognitive skills. Without a doubt this is due to the variety and versatility of concepts that fall under this dimension. A central problem in definition is the generalisation and the specificity of noncognitive skills or any related or subordinated constructs. Most studies offer either a more specific definition of a particular noncognitive skill or no definition at all, depending on the availability of data (Brunello and Schlotter, 2011).

In terms of definitions, the distinction of noncognitive skills as the counterpart of cognitive skills can be found frequently. However, it is generally not easy to distinguish cognitive from noncognitive traits. Some noncognitive traits, e.g. creativity or learning

styles are indeed connected to cognitive abilities. Because there is a large body of existing literature considering cognitive skills there is a variety of definitions. One of the most popular is by Weinert (2001), who defines cognitive skills as '[...]abilities that are available or that can be cognitively learned, for the purpose of solving certain problems, as well as the motivational, volitional and social willingness and ability, to be able to solve problems successfully and responsibly in varying situations' (p. 46). This definition includes noncognitive dimensions such as motivation and social willingness and uses them as prerequisites for cognitive functions. Another popular definition describes cognitive traits as 'holistic capability that has a distinctive history of quantitative and qualitative developmental change'. (Royer et al., 1993, p. 203). The emphasis here lies on the ability of a learned action. However, setting noncognitive skills in contrast to this, the question arises of whether or not noncognitive skills cannot be learned as well.

Another definition provided from an economic perspective by Borghans et al. (2008a, p. 3) describes noncognitive skills as 'patterns of thought, feelings, and behaviour'. This definition does not specify whether these patterns are systematic, (sub-)conscious and in which context they are needed. While this definition is broad, but it also shows that there is a vast range of noncognitive skills, which is not easy to sum up in one sentence. Personality viewed under this definition can be seen in two ways: First, as a predecessor of noncognitive skills that causes those patterns; or second, as a noncognitive skill itself, being direction guiding for actions and decisions. Rosen et al. (2010) provide a more concrete definition of noncognitive attributes as 'those academically and occupationally relevant skills and traits that are not specifically intellectual or analytical in nature' (ib., p. 1). This definition emphasises the relevance of noncognitive skills in an academically and occupational context and distinguishes them more clearly from cognitive skills.

To my knowledge, there is no major classification of noncognitive skills yet. Examples of noncognitive skills are numerous such as discipline, industriousness and perseverance as well as motivation, leadership abilities, or personality attributes such as self-confidences, locus of control, self-esteem, the five-factor model (Big Five), and impulsiveness (Farkas, 2003). Moreover, effort in learning, self-efficacy, social behaviour and coping strategies

as well as resilience can be summed up under noncognitive skills.

2.1 The History of Personality Research

People recognising themselves as individuals with individual differences is a relatively young concept. It arose at the time of the Renaissance (Winter and Barenbaum, 1999), where the importance of the living world and the recognition of humans as individuals replaced the theocentric world view. In the middle ages, people defined themselves less as individuals and more as part of certain groups or classes, such as people, guilds, and families (ib.). Modern psychology of personality, which is rooted in the late 19th century, has concentrated on three major topics: 'Individualism, a pervasive concern with irrationality and the unconscious, and a strong emphasis on measurement. [...] all three [...] did shape (and limit) the emerging field of personality psychology in important ways that can still be recognised' (ib., p. 4). Psychometrics developed from this field in the early twentieth century. Personality was thereby seen as something predictably changeable, where changes could be measured on linear scales. On the other hand, the study of the unconscious found its application mainly in psychiatry, with Freud and Jung as most prominent exponents. Qualitative case studies were conceived as outdated in the early 1900s.

Major ideas in personality research were developed in Germany. Only in the 1930s was research organised in specific journals, integrating different approaches, mainly from Germany, the UK and the US. Initiators of this process were Allport, who studied in Germany and later transferred to the US, Murray, and Lewin (McAdams, 1997). While Allport saw personality as an ordered and rational function, Murray described personality as an unordered mix from various memories, fantasies and identities. Those different parts show themselves in situations of particular needs, be it a material need or a psychogenic need, e.g. success, security or dominance. Lewin in contrast, set up the 'Field Theory' or 'Valence Theory', where a person's motivation to act is defined by the need of people to regain equilibrium. A field would be the setting of events in which a person exposed

to tension, through a physiological condition, a desire for something, or an intention to do something. He calls the place where a person reaches a particular goal and therefore reduces the tension 'valence'. The difference to Murray's theory, which sees motivated acting as a result of past person-environment interaction, is that Lewin sets act and goal into a coordinated relation. This theory became the basis of modern expectancy-value theories (McAdams, 1997). All personality theories aimed to explain motivated acting, where personality would be the predictor in differences of behaviour. Following the idea that people share and differ in certain aspects of personality, Cattell and Eysenck started identifying single items measuring personality traits in the 1950s. These traits were seen as latent variables resulting from measurable items. Multi-trait personality models have more than one factor and move on a higher level of abstraction than those using only one trait. The combination of different characteristics produces a multi-dimensional profile for each individual. As today, factor analysis was the first choice of method. This resulted in twelve and, respectively, three factors: '[...] [Eysenck; note from the author] argued that Cattell's 12 oblique factors were really equivalent to his own three orthogonal "'superfactors"' of Extraversion, Neuroticism and Psychoticism' (Winter and Barenbaum, 1999, p. 4). While Cattell's theory obtained only few followers, Eysenck laid the foundation for the popular five-factor model.

2.2 Measurement Concepts of Noncognitive Skills and Personality

Noncognitive skills can be assessed with regard to content-related, construct-related and criterion-related evidence (Borghans et al., 2008a; Heckman, 2008). Content-related skills refer to substantial meanings of the trait itself. They are identified through intensive interviews and can only be studied on a case by case basis. Assessing 'content-related' means assessing with qualitative methods and are rarely found in the literature. The construct-related approach is probably the most widely used method, especially by psychologists. It refers to the 'internal consistency of quantitative measures' (Heckman, 2008), which are

usually item batteries in self-assessment questionnaires. These items are similar to each other because they are more or less equally influenced by the underlying latent construct. There is also the possibility of evaluating multi-dimensional measurements. Therefore, the items should be convergent within a cluster and discriminant across clusters. One method to identify these clusters is factor models, which are very common in research of noncognitive skills. Criterion related methods are based on real behaviour in a natural environment usually by using proxies for correspondent sets of latent variables. A criterion, e.g. littering cigarettes, is observed, and a trait, e.g. sense of responsibility, is associated with the criterion. This approach is more direct and has the advantage that the criterion is actually observable, but it also has problems, especially in terms of validity.

The most commonly used measurements, especially for personality, are construct-related and can be found in the form of short item batteries in some large-scale data sets such as the German Socio-economic Panel in Germany, The British Cohort Study in Great Britain or the National Longitudinal Study in the US. Most literature, however, refers to US data. This might be due to the availability of the information, since it is a rather young area of research in Sociology and Economics. Smaller studies, conducted by psychologists often have longer questionnaires that may be more valid but are typically too long for large scale surveys. Unfortunately, the different items used across questionnaires of different studies, are very often too diverse and not directly comparable (see Rosen et al., 2010).

The content dimensional approach can again be subdivided into two categories: Structure oriented and process oriented measures (Boekaerts, 1996; Krohne, 1996).

Structure Oriented Measures

Boekaerts (1996) divides structure-oriented measures into single-trait theories, styles and multi-trait theories. Single-trait theories rely on one single trait, e.g. affects, attitudes and beliefs that are traits, or states like happiness and anxiety, or beliefs such as locus of control and achievement motivation. Personality measures such as self-esteem,

authoritarianism and anxiety also fall under this category. There is no proven theory that explains which item to choose for which kind of research. Often, the availability of instruments decides which factors to choose until a new, better measurement appears.

One dimension of single trait theories are so-called 'styles'. Styles are described as 'consistent modes of cognitive and affective processing, which influence the way cognitive abilities and affective traits are related to individual behaviour' (Boekaerts, 1996, p. 379). Styles can be divided into cognitive styles, learning styles, personality styles, and thinking styles. Cognitive styles refer to a person's information processing, e.g. flexibility and fluency in theorising, need for variety or preference for complexity. Learning styles describe individuals' preference for dealing with and handling a specific problem. An example is the three learning styles of Entwistle (1988): memorisation, trying to acquire high grades, and a search for personal understanding (Boekaerts, 1996). Thinking styles are a combination of personality and behavioural styles. Sternberg (1988) was the leading author in this area. Dweck (1999) for example, describes to what extent belief in malleable intelligence can boost learning success. Generally, the thinking style combines preferences through personal disposition with actual tendencies of behaviour. Studies have shown correlations between thinking styles and personality styles (Sternberg, 1994; Zhang, 2002).

Process Oriented Measures

Process oriented measures deal with the person as a whole and concentrate on how a person functions in a certain situation. It is not about traits but more about problem solving strategies such as self-regulatory strategies, coping skills and social cognitive processes (Boekaerts, 1996). The emphasis lies on the dynamic of the interaction, not on the individual's traits itself. Also motives of action are part of process oriented measures (Krohne, 1996). Most of the research conducted so far, however, has concentrated on structure oriented measures.

2.3 The Five-Factor Model

From the middle of the 20th century, higher performing computers led to a quickly growing number of different personality models, for example, the California Personality Inventory (CPI) by Gough (1957), the Beck Depression Inventory (BDI) by Beck et al. (1988, 1961), or the Myers-Briggs Type Indicator (Myers, 1963), just to name a few, among them the five-factor model ('Big Five'). The five-factor model is more of a summary of different models than the name of a specific instrument in itself. The instrument I will refer to, is the NEO Personality Inventory (PI) developed by Costa McCrae (1985) and the Revised NEO Personality Inventory (PI-R) (McCrae and John, 1992). The original name NEO refers to the original three dimensions included: Neuroticism (N), Extraversion (E), and Openness to Experience (O). Later, two more dimensions were added: Agreeableness (A) and Conscientiousness (C). Therefore, also the acronym OCEAN is commonly used when talking about the NEO PI(-R). The original form includes 6 facets (each as single items) for each dimension (table 2.1).

Even though critics remark that the inventory lacks a theoretical foundation (Almlund et al., 2011, p. 75), it has been one of the most widespread and acknowledged instruments in psychology until today. There is a high agreement among researchers for the Big Five being a suitable and comprehensive instrument for measuring personality (DeRaad and Schouwenburg, 1996; Mueller and Plug, 2006). The FFM has been tested in many cultural contexts, e.g. Germany, Israel, the US and Japan, and has been shown measurable across these different cultural contexts. It has been claimed to be relatively stable across adult life (Costa and McCrae, 1988; Thompson, 2008), something that will be discussed in more detail in 4.1. The strength of the FFM lies in the integration of many different personality traits, which were inconsistently named and distributed among earlier literature. However, there is no claim for sufficiency of the FFM in measuring personality.

The five dimensions are called Openness (to Experience), Conscientiousness, Extraversion, Agreeableness and Neuroticism, also abbreviated with the acronym OCEAN. Sometimes Roman numbers are used to make the dimensions more neutral. This is because in the literature there is a fairly good agreement on the number of dimensions, but not neces-

sarily on their interpretation (Digman, 1990). In this work I will refer to the full names of McCrae and John (1992) and the interpretation of the original creators of the scale (Costa and McCrae, 1985). Openness to Experience includes the appreciation of artistic work, curiosity and imagination as well as originality. Conscientiousness addresses a person's is organisation and efficiency as well as responsibility and ability to plan. Extraversion describes if a person is active and assertive, outgoing and talkative. Agreeableness includes if a person is forgiving, generous and kind. Neuroticism is the emotional stability of a person, e.g. if he or she is anxious, touchy or worrying a lot. Extraversion and Agreeableness represent social aspects of character. Their items aim to capture behaviour in social interaction. Neuroticism covers the emotional dimension; Conscientiousness and Openness to Experience refer more to intellectual personality dimensions.

2.4 Locus of Control

Locus of Control is a popular construct from psychological control research, emerging in the 1970s. The concept of control belief has numerous constructs, but they are different in their structure. As Skinner (1996, p. 549) sums it up:

> Even a cursory consideration of the area reveals a large number of terms, which, although different, nevertheless seem to be interrelated and partially overlapping. [...] One set of these constructs is based on the term control and includes, for example, personal control, sense of control, locus of control, cognitive control, agenda control, vicarious control, illusory control, outcome control, primary control, secondary control, action control, decisional control, predictive control, informational control and proxy control. The other set of constructs does not explicitly use the word control but nevertheless seems closely related, if not identical, to the set that does; these include helplessness, efficacy, agency, capacity, mastery, effectance, effectiveness, autonomy, self-determination, competence, contingency, causal attributions, explanatory style, responsibility, blame, probability of success, and outcome expectancy.

Table 2.1: The Big Five and its original factors

Domain		Facets	Definition of Factor
O (Openness)	O1	Fantasy	The degree to which a person needs intellectual stimulation, change, and variety.
	O2	Aesthetics	
	O3	Feelings	
	O4	Actions	
	O5	Ideas	
	O6	Values	
C (Conscientiousness)	C1	Competence	The degree to which a person is willing to comply with conventional rules, norms, and standards.
	C2	Order	
	C3	Dutifulness	
	C4	Achievement Striving	
	C5	Self-Discipline	
	C6	Deliberation	
E (Extraversion)	E1	Warmth	The degree to which a person needs attention and social interaction.
	E2	Gregariousness	
	E3	Assertiveness	
	E4	Activity	
	E5	Excitement-Seeking	
	E6	Positive Emotions	
A (Agreeableness)	A1	Trust	The degree to which a person needs pleasant and harmonious relations with others.
	A2	Straightforwardness	
	A3	Altruism	
	A4	Compliance	
	A5	Modesty	
	A6	Tender-Mindedness	
N (Neuroticism)	N1	Anxiety	The degree to which a person experiences the world as threatening and beyond his/her control.
	N2	Angry Hostility	
	N3	Depression	
	N4	Self-Consciousness	
	N5	Impulsiveness	
	N6	Vulnerability	

Source: Borghans et al. (2008a, p. 136)

Extensive research has been done on different constructs of control, showing variations in outcomes such as personal well-being, health, coping and success. Due to the large variety of constructs however, many studies are not comparable. Differences in results can be perplexing if the differences between the constructs are not clear. Vice versa, even if studies have used the same or a very similar construct, it is likely that these studies cannot be found under the same label (Skinner, 1996).

To understand the concept of control, it is best to start with the reactions of animals. In numerous (rather cruel) studies was shown how animals behaviour changes when the control over a painful situation was taken from them. To spare the gentle reader from the dreadful details, I summarise the main result of series of studies by Seligman et al. (1968). The research subjects were dogs exposed to electric shocks, one group physically constrained and the second group put in a box that enabled the dogs to end the shocks by showing certain behaviours. In the second part of the experiment, dogs were set in a box, where escape from the shock was not possible. Seligman et al. found the dogs to be helplessly exposed to the shock in the first part of the experiment to resign. They suffered without even trying to escape. This is what Seligman labelled as 'learned helplessness'. The other dogs, who had learned before that the shock could be avoided by a certain behaviour struggled hard by barking, jumping and trying to run to avoid the pain. When the researchers introduced an obvious way for the dogs to escape (a kennel with a movable exit door), the second group of dogs learned much faster to use the new option of avoidance. In the original series of experiments many more options and variations were conducted.

Learned helplessness is not only a phenomenon in animals but also in humans. This was most drastically shown in chronically ill people. One study described a series of suicides in psychiatry after a number of discouraging arguments with staff members. The patients simply lost hope ever to be better again (Lefcourt, 1973). Of course, these three examples are the extremes of the subjective loss of control. However, they underline the extent of effects control beliefs have. The good news is: These beliefs can be learned and changed and the focus of psychological research shifted from hopelessness to encouraging

and improving self-perception, emotional well-being, mastery orientation, and success (e.g. Dweck, 2008, 1999; Hansemark, 1998), which is the link of those control beliefs to school and labour market outcomes.

Locus of Control measures the difference between individuals in their attribution of control over their lives. Some individuals tend to think that they have little or no control over what happens in their lives, while others believe that they control most of the things that happen to them. These are called external and internal attributions of control (Weinhardt and Schupp, 2011; Judge et al., 2002; Rotter, 1966). This concept is close to social psychological theories of attributions (Seligman, 1972; Weiner, 1972). One of these theories is the attribution theory by Kelley (1973), which describes that actors differently attribute positive and negative events to internal and external factors, which they cognitively process to a logical conclusion about control. Depending on this control thought, individuals act accordingly. The internal attribution of control is predictive for motivation and goal settings. Only if control is attributed to oneself will individuals understand it as malleable under their influence and therefore it becomes the precondition of action. The external attribution can lead to so called 'learned helplessness' (Seligman, 1972). This means that the individual does not recognise their own control over a situation and thinks nothing can be changed by their actions. This prevents the individual from taking action for improvement. It can even lead to – or is typical of – depressive behaviour (Alloy and Abramson, 1982; Klein et al., 1976). Among all kinds of measures over different dimensions of control, the construct Locus of Control has grown to be the most popular measure (Lefcourt, 2014). Developed by Rotter (1954) the measures are now widely used in surveys and psychological studies. Table 2.2 shows the original questions of Rotter's measurement.

Table 2.2: Rotter's original questionnaire of assessing Locus of Control (1954)

Item no.	Item poles	Item text
1	Filler a	Children get into trouble because their parents punish them too much.
	Filler b	The trouble with most children nowadays is that their parents are too easy with them.

Table 2.2 continued

Item no.	Item poles	Item text
2	**a**	Many of the unhappy things in people's life are partly due to bad luck.
	b	People's misfortunes result from the mistakes they make.
3	a	One of the major reasons why we have wars is because people don't take enough interest in politics.
	b	There will always be wars, no matter how hard people try to prevent them.
4	a	In the long run people get the respect they deserve in this world.
	b	Unfortunately, an individual's worth often passes unrecognised no matter how hard he tries.
5	a	The idea that teachers are unfair to students is nonsense.
	b	Most students don't realise the extent to which their grades are influenced by accidental happenings.
6	**a**	Without the right breaks one cannot be an effective leader.
	b	Capable people who fail to become leaders have not taken advantage of their opportunities.
7	**a**	No matter how hard you try some people just don't like you.
	b	People who can't get others to like them don't understand how to get along with others.
8	Filler a	Heredity plays the major role in determining one's personality.
	Filler b	It is one's experiences in life which determine what they're like.
9	**a**	I have often found that what is going to happen will happen.
	b	Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
10	a	In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
	b	Many times exam questions lend to be so unrelated to course work that studying is really useless.
11	a	Becoming a success is a matter of hard work, luck has little or nothing to do with it.
	b	Getting a good job depends mainly on being in the right place at the right time.
12	a	The average citizen can have an influence in government decisions.
	b	This world is run by the few people in power, and there is not much the little guy can do about it.
13	a	When I make plans, I am almost certain that I can make them work.
	b	It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

Table 2.2 continued

Item no.	Item poles	Item text
14	Filler a	There are certain people who are just no good.
	Filler b	There is some good in everyone.
15	a	In my case getting what I want has little or nothing to do with luck.
	b	Many times we might just as well decide what to do by flipping a coin.
16	**a**	Who gets to be the boss often depends on who was lucky enough to be in the right place first.
	b	Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.
17	**a**	As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.
	b	By taking an active part in political and social affairs the people can control world events.
18	**a**	Most people don't realise the extent to which their lives are controlled by accidental happenings.
	b	There really is no such thing as 'luck'.
19	Filler a	One should always be willing to admit mistakes.
	Filler b	It is usually best to cover up one's mistakes.
20	**a**	It is hard to know whether or not a person really likes you.
	b	How many friends you have depends upon how nice a person you are.
21	**a**	In the long run the bad things that happen to us are balanced by the good ones.
	b	Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.
22	a	With enough effort we can wipe out political corruption.
	b	It is difficult for people to have much control over the things politicians do in office.
23	**a**	Sometimes I can't understand how teachers arrive at the grades they give.
	b	There is a direct connection between how hard I study and the grades I get.
24	Filler a	A good leader expects people to decide for themselves what they should do.
	Filler b	A good leader makes it clear to everybody what their jobs are.
25	**a**	Many times I feel that I have little influence over the things that happen to me.

Table 2.2 continued

Item no.	Item poles	Item text
	b	It is impossible for me to believe that chance or luck play an important role in my life.
26	a	People are lonely because they don't try to be friendly.
	b	There's not much use in trying too hard to please people, if they like you, they like you.
27	Filler a	There is too much emphasis on athletics in high school.
	Filler b	Team sports are an excellent way to build character.
28	a	What happens to me is my own doing.
	b	Sometimes I feel that I don't have enough control over the direction my life is taking.
29	**a**	Most of the time I can't understand why politicians behave the way they do.
	b	In the long run the people are responsible for bad government on a national as well as on a local level.

Source: Rotter (1954, pp. 11)
Items poled towards high values in externally located control in bold print

Rotter (1954) defines his internal versus external control attribution construct as the following:

> [...] an event regarded by some persons as a reward or reinforcement may be differently perceived and reacted to by others. One of the determinants of this reaction is the degree to which the individual perceives that the reward follows from, or is contingent upon, his own behaviour or attributes versus the degree to which he feels the reward is controlled by forces outside of himself and may occur independently of his own actions. The effect of a reinforcement following some behaviour on the part of a human subject, in other words, is not a simple stamping-in process but depends upon whether or not the person perceives a causal relationship between his own behaviour and the reward. A perception of self-action and outcome can vary in degree. When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as the result of luck, chance, fate, as under the control

> of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual, we have labelled this a belief in external control. If the person perceives that the event is contingent upon his own behaviour or his own relatively permanent characteristics, we have termed this a belief in internal control.

In addition to the learned helplessness concept of Seligman, Rotter emphasises the cognitive judgement and subjective perception of the situation instead of simple conditioning. If the control is perceived as out of the control of the individual, dependent on luck, fate or others, he labels it 'external control'. On the other hand, people showing 'internal control', believe that the outcome of an event was or will be dependent on their own action.

Rotter also states that the Locus of Control is not the expectancy of an outcome, rather than a reinforcement between the expectancy and the outcome. On an abstract level, he talks about specific and general expectancies. As the name suggests, specific expectancies are connected to the outcome of a specific situation. In contrast, general expectancies are about undefined situations, more of a belief, drawn from learned attitudes and experiences. Specific expectancies can predict a behavioural outcome of a person correctly, when the situation is the same or rather similar to a situation already familiar to the individual. There is security in the judgement of the individual about how to reach a certain outcome and, therefore, the individual will react accordingly. However, if the situation is unknown, there is insecurity and therefore people will draw from general beliefs or knowledge. The measurements of Locus of Control indicates the general attitudes of people towards life and not specific expectancies in specific situations. Therefore, Locus of Control is not supposed to predict behaviour precisely in repeated situations, but to cover a trend of decisions taken by individuals because of their general beliefs. For example, a student revising for a maths test, with the specific expectancy of failing because he or she has failed in maths tests before, will have a number of different alternative behaviours in mind: Not revising at all, for expecting failure anyway, or, since there is a

chance of improving, because it is a different test, trying to learn, as his or her general Locus of Control is internal and therefore success is connected to the effort taken to reach it. Rotter's assumption is, the more similar the situation is, e.g. the same subject and the same teacher, the more likely the specific expectancies decide over the behaviour. The more the situation differs, e.g. a geography test instead of maths or a new school year with a different teacher, the more general expectancies guide the behaviour of individuals.

One of the most common critiques about Locus of Control and social class and attainment is the direction of causality. Locus of Control is not a general predictor of life decision, but a catalyst towards a certain behaviour in unknown situations, which means that failure in one career decision does not necessarily demotivate success-striving behaviour in another career decision, depending on how similar the first situation is to the next. In terms of social learning, social status of the parents imprints children's Locus of Control. However, low social status does not necessarily cause external Locus of Control. Locus of control can be shaped by many other things than low social status or income, such as child abuse or peer effects. It then effects disadvantageous or advantageous behaviour in situations new to individuals rather than previous experiences of the family. Various situations and events, such as career changes, can contribute to shape Locus of Control. As demonstrated in Seligman's learned helplessness concept, constant failure in attainment can lead to the feeling of lacking control, which in turn shows in a tendency for external Locus of Control. On the other hand, own initiative, effort and acting will improve chances of success. Most likely it is a reciprocal relationship. In chapter 6 I will try to capture the reciprocity of attainment and Locus of Control, by modelling a dynamic model with different time point of measurements of both attainment and Locus of control to see the trend of causal direction.

3 Data and Operationalisation

The data used for this study is the German Socio-Economic Panel (GSOEP) and its additional module, the GSOEP Youth Questionnaire. The GSOEP is a representative sample of about 11,000 households in Germany, containing approximately 22,000 persons. It started in 1984 and is one of the longest running panel studies in the world. The survey is conducted yearly with random survey dates. It contains extensive information about the socio-economic situation of the household as well as a monthly biography employment history of the respondents. In addition, questions about personality and life satisfaction are included.

The German Socio-Economic Panel is provided by the Institute for Economic Research (DIW) and contains educational information for three generations: the respondents of the Youth Questionnaire, their parents as respondents of the main questionnaire, and indirectly the parents of the respondents of the main questionnaire. For the two younger generations, the participants of the Youth and main questionnaire, first-hand information on education and income and personality measures are available. For the first (oldest) generation, the parents of the participants of the main questionnaire, only reported information on education by the participants is available. For those, no personality measures are available. So, in contrast to the analysis with the youth questionnaire, it is not possible to look at the influence of parental personality, but only the personality of the children (which in turn are the parents in the Youth Questionnaire). An advantage of using the sample of the main questionnaire is the possibility of examining on long-term outcomes such as the highest degree obtained and income, where there is only selective data available for the 17-year-olds in the Youth Questionnaire.

Personality questions are only asked in selected years. Some constructs of personality traits have been changed over the years, which limits their usability. The Locus of Control was surveyed in 1999, 2005, and 2010. The 1999 version differs in questions and coding from the other years and can therefore not be used for the analyses. An item battery of Big Five was asked in 2005, 2009 and 2013. Due to the availability of the data, only the chapter section 4.5 contains the wave of 2013. The other chapters contain data from 2000 to 2012.

The second sample results from the Youth Questionnaire (Lohmann et al., 2011; Weinhardt and Schupp, 2011). In this additional side panel, children of the households of the main panel aged 17 are interviewed. This is the first time when youths participate actively in the SOEP. In the next year following the interview for the Youth Questionnaire, they can continue as 18-year-olds as a regular part of the original household panel with the standard personal questionnaire. The Youth Questionnaire was introduced in the year 2000. Due to the randomisation of the time of the interviews across each wave, children can also be 16 or 18 at the time of the interview. They are included in the interviews when they complete their 17^{th} year within the survey wave. For language simplification, in the following chapters they are summarised and referred to as 17-year-olds or youths. The respondents are born between 1982 and 1995, so in the last wave in 2012 the pooled dataset contains information from youths aged 17. For the ones continuing the survey, information on later educational outcomes could be analysed with the additional information from the youth questionnaire. Only about 10% of the participants of the Youth Questionnaire, however, continue more than one wave when they pass to the main questionnaire.

The Youth Questionnaire contains questions about free-time activities, work and schooling as well as questions about their socialisation and family life. As personality traits, again the Big Five and Locus of Control are included. The Big Five were included in the questionnaire from the beginning in 2000, while Locus of Control was added later in 2006. Combining this sub-sample with the main sample enables a direct comparison of personal characteristics of the interviewed children with their parents. This gives us

the unique opportunity to compare personality and educational outcomes from parents and children first hand. Because the children are only interviewed once with the Youth Questionnaire and then change to the adult questionnaire, the resulting data set of the youth questionnaire is pooled cross-sectional and not longitudinal.

Parental information is taken from a generated parental data set, provided by the DIW (Frick et al., 2005), from reported information by the children in the Youth Questionnaire, as well as from merged panel data from the main questionnaire. This data set was merged with the self-reported data of the children from the Youth Questionnaire.

All the coding and the following analyses were conducted with the software package STATA 13.

3.1 Sample

Units of analysis are dependent on the research questions in the different chapters. For questions regarding the adults, the units are surveyed people in the main questionnaire and the information on their parents is taken by the information given by the respondents. In the Youth Questionnaire the units are the children and information of their parents are added from the self-reported data of their parents in the main questionnaire. While the main questionnaire is a representative household sample for Germany, the youth questionnaire, in contrast, is not a random sample of the German population. They are the children of the randomly drawn households, who are in their 17^{th} year after birth. The original youth sample contains 3796 cases.

Because of the large intervals on interviewing parents' personality traits, not all of the children have matched information on the personality of their parents. This results in different case numbers when this information is used. The procedure with missing values differs across analyses since some methods allow imputation while others are not suited for it. The case numbers vary notably across the different chapters, depending on the object of research and the hypotheses. Cases were generally excluded when the complete item battery of either the Big Five or Locus of Control was missing. However, the cases

from 2000 and to 2005 contain only Locus of Control because the Big Five were only introduced in 2006. These cases were kept whenever Locus of Control is analysed as a single predictor, without the Big Five, in models. Furthermore, cases were excluded where the type of school, as a central variable, was missing and not to be identified by other variables. The procedure for identifying missing values in type of school and grades is described in Chapter 3.3.1. The final youth sample size is $N = 3,325$.

In correlation analyses cases were excluded pairwise. In regression models of any kind, cases were excluded listwise. When applying Structural Equation Modelling, the Stata estimation with Maximum Likelihood with Missing Values (MLMV) was used. MLMV, also known as Full Information Maximum Likelihood (FIML), reconstructs missing information from other available values in the dataset. MLMV has been shown to be a reliable imputation method, that is superior under the MCAR (missing completely at random) and MAR (missing at random) condition to other ad-hoc based solutions, such as listwise and pairwise deletion or simple model based solutions such as regression imputation (Wiggins and Sacker, 2002). Before imputing, I tested the data for the MCAR assumption with Little's MCAR test for information on the parents, on the children and on both combined. The Chi-Square test was not significant, neither did two one-tailed t-tests indicate significant differences. These results support the assumption of missing values being completely at random. Why and how missing values are treated and what the considerations of the specific samples are, is reported in more detail in each of the empirical chapters. In general, missing information on income and education of the parents was imputed by the imputation variables provided by Socio-economic Panel Study (SOEP Group, 2017). Considering the number of cases in relation to the complexity of the models used, the minimum significance level is set to 10% (p<0,1).

Ideally, this study would follow the youth sample into adulthood, observing personality traits and final educational and labour market outcomes longitudinally. This information is, however, rarely available. In my sample, the highest level of education and the income in the first stable job could not be found for about 90% of the participants. This is partly panel attrition among young people, mostly because youths leave the parental household

after finishing secondary education and do not continue to participate or, to a lesser extent, they cannot be followed when moving in later years. The other part is due to right censoring because the participants are too young. When taking the original gross sample as provided in the scientific use file without excluding cases, the transition rate from the youth questionnaire to the first follow-up wave is 81% (3,194 of 3,946 cases).

3.2 Weighting

To generalise results to the population, I used weights for the main sample (Kroh, 2008; Spiess, 2004). The SOEP offers two different kinds of weights: first, the cross-sectional weights and second, the longitudinal weights. The cross-sectional weights are the inverse sampling probability ($\frac{1}{SP}$) of a person, based on household and individual characteristics. Even though longitudinal weighting is also available, and the data is in fact drawn from a longitudinal dataset, the resulting dataset does not have a longitudinal structure. Cross-sectional weights are sufficient. Weights are only available for the main questionnaire, but not for the Youth Questionnaire. Weights are only used when inference to the population is the aim of an analysis. When the analysis aims to validate a model or effect weighting is not used.

3.3 Operationalisation

3.3.1 Educational Performance – Maths Grades

Maths grades were chosen as a measure for school performance, in contrast to highest school type attended or years of education (see below), which were chosen to measure educational performance. maths grades can be used as a proxy for cognitive abilities and this is commonly done (e.g. Protsch and Solga, 2015), however there is a lot of evidence that maths grades are not completely explained by cognitive abilities. It is more of a result of a combination of some cognitive abilities and previous training in this field (e.g. Desoete and Roeyers, 2005; Passolunghi et al., 2008; Geary, 2011) and is therefore, due

to the unexplained part, an interesting outcome for exploring the influence of personality.

Maths grades tend to be less influenced by language skills, which are often connected to migration background, which bears in turn, a selectiveness of socio-economic status and interactions in the speed of language learning and applying. This can be seen best in the effect of migration background that tends to be bigger for the language of the receiving country rather than maths (e.g. Kristen et al., 2014). In sum, maths grades are variable for measuring school performance that is less confounded with uncontrolled third variables, although migration background is taken into consideration in the following estimations.

Nevertheless, it should be mentioned, that German grades and maths grades are strongly correlated and also that an index of both grades or even grades of other subjects would be a reasonable alternative when trying to measure overall performance in school. This is an empirical argument, but indices need to be theoretically profound in terms of variables measuring the same construct, too. Language learning and mathematical learning are often seen as different learning domains with different learning mechanisms. Influential factors can have similar effects on both subjects (Fuligni, 1997; Kluczniok et al., 2013), but with regard to personality there are indications for major differences in effects for different domains (Schnabel et al., 2002; Spinath et al., 2010). This is especially interesting when taking into account that maths takes more active learning effort than writing or reading someone's own native language. This needs noncognitive abilities such as dealing with failure (Dweck and Leggett, 1988; Ivcevic and Brackett, 2014) or developing learning styles (Busato et al., 1998; Kolb and Kolb, 2005). So, it is an interesting variable to measure school performance in terms of a more comprehensive set of personality variables.

When using grades as measure of cognitive abilities to predict further educational or labour market outcomes, a particular German problem arises: Because of the tripartite nature of the school system, grades are not comparable over school types. Therefore, it is necessary to divide the three school types into separate analyses. Self-reported maths grades are recoded from the German grading system (from 1–'very good' to 6–

'not sufficient' into 6–'very good' to 1–'not sufficient') to make the interpretation of the results more intuitive. If students reported grades in points from 0–15, as it is common in German upper secondary schools, points were linearly transformed into the 1–6 scale. There is no loss in information, because the grade points are a direct derivation of the German standard grading scale from 1–6. Self-reported maths grades are recoded from the German grading system (from 1–'very good' to 6–'not sufficient' into 6–'very good' to 1–'not sufficient') to make the interpretation of the results more intuitive. If students reported grades in points from 0–15, as it is common in German upper secondary schools, points were linearly transformed into the 1–6 scale. There is no loss in information, because the grade points are a direct derivation of the German standard grading scale from 1–6.

3.3.2 Educational Achievement – Highest School Type Attended

To measure educational achievement among the 17-year-olds, the highest school type attended was chosen as a measure. The highest school type was coded into three groups typical of the German school system: lower secondary (Hauptschule), intermediate secondary (Realschule) and upper secondary (Gymnasium). This was simply derived from the questionnaire that asked specifically for the highest school type attended.

The introduction of comprehensive schools in some federal states caused some disturbance in this typology. Because the children are still separated within schools by performance level and final qualification, the final categories are the result same as in the old system, i.e. the categorisation still applies to students visiting a comprehensive school.

To separate students into their referring tracks, I used the specificity of the German tripartite system in which children finish lower, intermediate and upper secondary after different years of education. For those in lower and intermediate secondary schools, school education ends after 9 and 10 years respectively. The degree attained at age 17 was also a question in the questionnaire, which makes it easy to allocate them into the tripartite

Table 3.1: Distribution of 17-year-olds over secondary school types

Type of School	*N*	Percent
Lower sec.	628	21.1
Intermediate sec.	1067	35.8
Upper sec.	1284	43.1
Total	2979	100.0

GSOEP Youth Questionnaire

system. So, the highest qualification was checked, which was available for those with a lower secondary degree and some with an intermediate secondary degree, and in one case for an upper secondary degree, and coded into the referring tracks. Some of the students were, however, not uniquely identified through these two variables.

In case this information was not available, e.g. if students were late in finishing intermediate secondary or attending upper secondary, I checked for the type of grades. Students in upper secondary school receive points instead of grades, and this was asked in the questionnaire. So, students in comprehensive schools receiving points instead of grades were coded into upper secondary schools. 10 cases could be identified with this method. There are 346 missing values, about 10%, that were missing from the beginning or not possible to be uniquely identified.

Table 3.1 shows the distribution of students over the secondary school types. Most students visit upper secondary schools, followed by intermediate secondary, and lower secondary at the bottom of the distribution. This is very much in line with the report and official German data of the Federal Office for Statistics for 2013, the same year of the last wave of the dataset used (Malecki et al., 2014).

3.3.3 Education of the Parents

For parents, complete information on their educational career is available due to the main panel of the SOEP. The final educational achievement cannot be measured among 17-year-olds due to right censoring. Therefore, the highest year of education refers to the adult sample of the main questionnaire. Due to the complexity and number of different

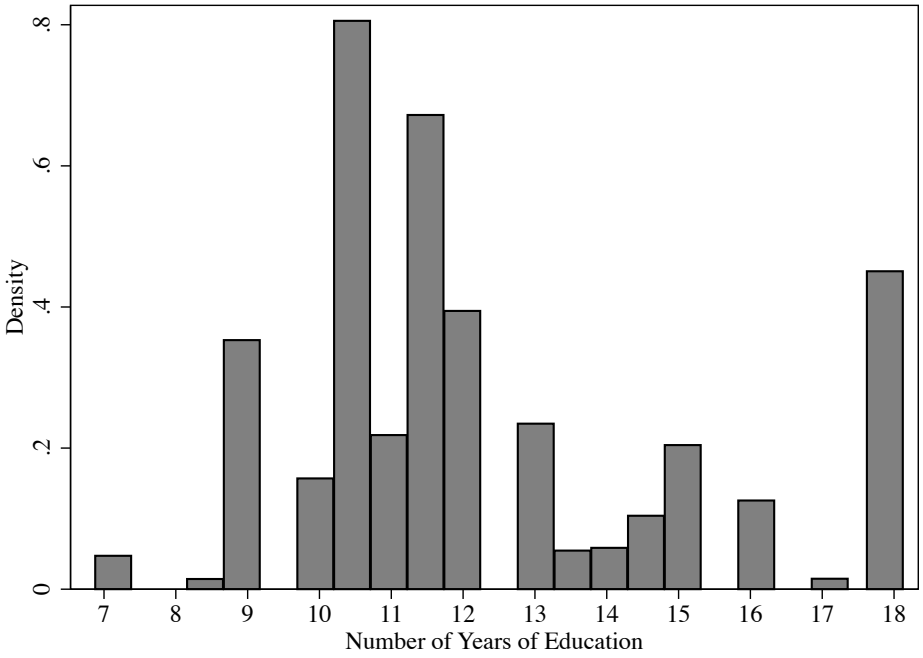
German school qualifications, hypothetical years of education were coded. Hypothetical years of education are a measure often used in comparative research (Schneider, 2009), however it yields several advantages for micro-sociological research as well. Compared to a mere grouping of educational attainments, hypothetical years are a metric measure that is more precise than actual years of education and takes vocational training and tertiary education into account. Compared to the original coding, hypothetical years of education is the metric variable that loses the least explanatory power (ib.). The scale ranges from 7 'no degree' to 18 'college/university degree or higher'. For detailed information on the generating of the scale see Grabka (2016). The distribution indicates most persons being in the middle categories which represent mainly lower and intermediate school degrees plus different kinds of vocational training and, with some distance in between, a peak in holding an academic degree. For analysis of parental education on outcomes of the children, the parental education is used at the point of time the child was 17 years old. While the youth sample shows a trend towards upper tertiary education that allows access to higher tertiary education, the adult sample mirrors adequately the age structure and the steady rise in educational level over the past decades (Mueller et al., 2017; Reimer and Pollak, 2010). The average age in the adult sample is 47.7.

This study focuses on parental education as the main predictor for explaining educational performance and outcomes, as it has been shown that parental education in the case of Germany to be the predominant factor on educational outcomes compared to income (Blossfeld, 1993; Buchholz et al., 2017; Lauterbach and Fend, 2017; Pollak and Reimer, 2005, e.g.).

The studies concentrate on effects of education of the parents on educational outcomes of the children rather than income or socio-economic status. This emphasises the cognitive support parents can give, directly and indirectly, rather than drawing on financial resources. Nevertheless, income and socio-economic are controlled for where applicable[1].

[1]Models in which these two variables were used indicate very similar behaviour as education of the parents in relation to personality.

Figure 3.1: Distribution of years of education in the adult sample



SOEP main questionnaire, wave 2013, unweighted data, N = 20,100

3.3.4 Income

To measure career outcomes as a dependent variable, the gross monthly income is taken. Instead of the net income that mirrors more the actual available amount of money for a person, the gross income was chosen to measure the amount of market value of the labour of a specific person on the labour market. Rather than what a person has left for use, as makes sense e.g. in poverty research, the gross income represents (ideally) the compensation of the performance of an individual.

In contrast, in the analyses where the reproduction of inequality is measured, net income is used as a control variable. Net income captures the aspect of material possibilities and opportunities of families into the model. Net income was chosen over gross income to control for available financial means of a person's family background in contrast to income as an effective outcome variable. For the latter, gross income is better suited. Net income reflects the families' possibilities to support their children through material means, e.g. books and instruments, or services such as additional tutoring and access

to private schools or high-quality pre-school education. In contrast to gross income, net income is the available amount of money that can actually be spent on fostering kids. When estimating models where household income is used as a control variable, it is net income and represents the families' financial possibilities into educational investments. Gross income, in contrast, is used as an indicator for labour market return, in a sense of how much an employer is willing to pay. In models where income is supposed to reflect labour market returns and therefore labour market success, monthly gross income is applied as a measure.

3.3.5 Personality

Five-Factor Model (FFM; Big Five)

The Big Five are ideally measured with all of its facets, that are six for each dimension (as presented in table 2.1. Shorter versions have, however, been developed and validated such as the short form of the Big Five measurement, the so-called NEO-FFI and the BFI. The constructors of the GSOEP decided to develop an even shorter form, the BFI-S (table 3.2) for inclusion into the survey (Gerlitz and Schupp, 2005). Items are coded from 1–'applies not at all' to 7–'applies completely'.

For testing the validity of the constructs, a principal component analysis (PCA) with rotated factors was conducted, separately for the 17-year-olds (table 3.3) and the adult sample (table 3.4). Inverted items were recoded towards the other items of the dimensions (see table 3.2). The youth sample did not initially show a 5 factor but a 6 factor structure. When explicitly testing for a 5 factor solution, the factor loadings showed the expected pattern. This solution is in line with the item description provided by the DIW (Weinhardt and Schupp, 2011). The factors in the youth sample explain about 59% of the item variance. Following the interpretation of Tabachnick and Fidell (2001) and Costello and Osborne (2005), the threshold for including a variable into a factor was drawn at 0.32 (poor fit). Tabachnick and Fidell (2001) further suggest 0.63 indicating very good and 0.71 excellent fit. The fourth item of Openness for Experience (eager for knowledge) loads to a weak degree also on Conscientiousness. The factor loadings of the items on factor

Table 3.2: Items of the Big Five

Item	Item text	Dimension
I see myself as someone who...		
1	does a thorough job	C
2	is talkative	E
3	is sometimes rude to others (-)	A
4	is original, comes up with new ideas	O
5	worries a lot	N
6	has a forgiving nature	A
7	tends to be lazy (-)	C
8	is outgoing, sociable	E
9	values artistic, aesthetic experiences	O
10	gets nervous easily	N
11	does things efficiently	C
12	is reserved, quiet (-)	E
13	is considerate and kind to almost everyone	A
14	has an active imagination	O
15	is relaxed, handles stress well (-)	N
16	is eager for knowledge*	O

Source: Weinhardt and Schupp (2011, p. 9), items marked with (-) are inverse

* only in the Youth Questionnaire

3 is fair (values artistic experiences, original) to very good (active imagination). The item 'eager for knowledge' was not included in the adult questionnaire, but was added by the data providers to the youth questionnaire. When removing the fourth item, the factor loadings of the remaining items improve: 'Original' rises to 0.54, 'values artistic experiences' to 0.62 and 'active imagination' to 0.72 without any cross-loadings. Besides the fact that the fourth item was added by the data providers without obvious reasons, there are two reasons to remove this item: First, the resulting factor of Openness for Experiences becomes more consistent, and second, an additional item would bear several problems in comparability of the construct in the youth sample and the construct in the adult sample. Therefore, this item was excluded from further analysis.

The three items of Conscientiousness, besides the cross-loading of the (later excluded) fourth item of Openness for Experience, show very good ('tends to be lazy (-)') to excellent ('does a thorough job' and 'does things efficiently'). The items of Extraversion load excellent on factor 1. Agreeableness shows satisfying factor loadings of 0.64 and higher, similarly, Neuroticism with 0.63 and higher.

In contrast to the youth sample, the factor analysis with the adult sample showed 5 natural factors without cross-loadings from the beginning. All of the factor loadings within factors indicate very good fit (0.62) and higher. The differences in case numbers, which is considerably high (1,310 to 18,295) is not the reason for these differences. Results of PCA tend to be more consistent with higher numbers of cases. The quality of the PCA depend on the interplay of several factors. First, the commonalities within factors: When they are weak, a higher number of indicators and cases can improve consistency. Second, the case number in ratio of the number of variables must be sufficiently high to identify the model and provide a satisfying number of degrees of freedom, where 'rules of thumb' vary very much across literature (MacCallum et al., 2001). When interpreting the results of the two analyses, two main messages can be made. Firstly, the model of the adult sample shows a very good fit and the dimensions of the Big Five are clearly distinct from another. The youth sample does show similar patterns, however, there were minor cross-loadings. The threshold I have applied is already one of the more restrictive ones, and

besides the item ‘eager for knowledge’, the dimensions could be clearly identified. When removing this item, the model reaches a similar quality than the model from the adult sample. Second, if one would interpret the effect of the different case numbers, it would point towards the model of the adult sample being the more consistent one. Overall, the Big Five dimensions turn out again, as in many previous studies, to be unique and covering five different aspects of personality.

Table 3.3: Principal component factor analysis of the Big Five for 5 factors in the youth sample, rotated, $N = 1,310$

Dimension	Variable	Factor1	Factor2	Factor3	Factor4	Factor5
Openness for Experience	original	0.50	0.18	**0.49**	0.09	−0.07
	values artistic experiences	0.07	0.05	**0.61**	0.13	0.13
	active imagination	0.21	−0.14	**0.67**	0.04	0.09
	eager for knowledge	−0.07	0.40	**0.57**	−0.27	−0.02
Conscientiousness	does a thorough job	0.04	**0.82**	0.06	0.02	0.11
	tends to be lazy (-)	0.00	**0.69**	−0.26	−0.11	0.07
	does things efficiently	0.10	**0.74**	0.20	0.00	0.15
Extraversion	is talkative	**0.83**	0.13	0.08	0.02	0.08
	is outgoing	**0.78**	0.02	0.17	−0.04	0.16
	is reserved (-)	**0.77**	−0.08	−0.09	−0.19	−0.16
Agreeableness	is rude (-)	−0.18	0.10	−0.19	−0.21	**0.71**
	is forgiving	0.19	0.02	0.22	0.08	**0**.64
	considerate and kind	0.13	0.25	0.15	0.10	**0**.73
Neuroticism	worries a lot	0.04	−0.01	0.17	**0.74**	0.10
	nervous	−0.18	−0.03	0.02	**0.75**	0.00
	relaxed	−0.07	−0.05	−0.31	**0.63**	−0.22

Youth Questionnaire
Items marked with (-) are inverse and re-coded corresponding to the other items in the dimension

Table 3.4: Principal component factor analysis of the Big Five for 5 factors in the adult sample, rotated, N = 14,346

Dimension	Variable	Factor1	Factor2	Factor3	Factor4	Factor5
Openness for Experience	original	0.23	0.30	**0.69**	−0.11	−0.16
	values artistic experiences	0.02	0.01	**0.66**	0.07	0.22
	active imagination	0.00	0.20	**0.77**	0.01	0.04
Conscientiousness	does a thorough job	**0.84**	0.04	0.06	−0.01	0.07
	tends to be lazy (-)	**0.64**	0.11	−0.27	0.01	0.21
	does things efficiently	**0.78**	0.07	0.22	−0.09	0.09
Extraversion	is talkative	0.23	**0.75**	0.26	0.01	0.16
	is outgoing	0.12	**0.75**	0.30	−0.06	0.16
	is reserved (-)	−0.11	**0.80**	−0.08	−0.13	−0.22
Agreeableness	is rude (-)	0.04	−0.10	−0.19	−0.13	**0.76**
	is forgiving	0.06	0.17	0.15	−0.01	**0.62**
	considerate and kind	0.27	0.08	0.22	0.03	**0.71**
Neuroticism	worries a lot	0.17	−0.04	0.07	**0.75**	0.03
	nervous	−0.09	−0.09	0.08	**0.82**	−0.04
	relaxed	−0.19	−0.04	−0.26	**0.72**	−0.11

main questionnaire
Items marked with (-) are inverse and re-coded corresponding to the other items in the dimension

The coefficients indicate the expected five-factor structure, however, one item (item 14) that should theoretically be situated within the Openness category, loads higher on the sociability dimension. Since Openness has four instead of three items anyway, it is possible to exclude this item without any problems. Indeed, the PCA yields an even a better fit for the factors without item 14. Therefore, and because theoretically there is no need to keep it, it will be excluded for the following analysis. This results in three items per dimension.

To test reliability of measurements there are several methods. Two methods in particular are commonly used when working with survey data, test-retest reliability and the split-half reliability. The test-retest reliability refers to reliability as stability of a measurement over time. A reliable measurement would measure the same if the results of a measurement is highly correlated over different time points. This can be a problem when using panel data, where different measures at different time points mean change in a variable. This is particularly problematic when looking at personality measures: As discussed in section 4.1, research so far has produced different results about stability of personality over time. High correlations between different time points could indicate stability in personality, while low correlations could indicate instability. So, for the panel structure of the adult sample it is not reasonable to use the test-retest-reliability. In contrast, the data of the children is pooled-cross-sectional. Here, it is not possible to test the measurements in different time-points because children were only interviewed once.

The split-half-method tries to measure reliability by comparing the means in two subsamples. A significant difference would indicate low reliability. The split-half-method can be applied in both samples, the youth sample and the adult sample. In each sample, persons were randomly assigned into two equally sized groups. No personality trait showed a significant difference in mean across the two randomised groups in the youth sample. The null-hypothesis that the groups are the same cannot be discarded.

Table 3.5: Items of Locus of Control

Item	Item text
1	How my life goes depends on myself. (-)
2	What you achieve in life is in the first place a matter of fate or luck.
3	I often experience, that others determine my life.
4	You have to work hard for success. (-)
5	When I meet difficulties in life I often doubt my abilities.
6	The possibilities you have in life depend on social circumstances.
7	Abilities that you own are more important than all efforts. (-)
8	I have little control over the things, that happen in my life.

Source: After Gerlitz and Schupp (2005, p. 30), items marked with (-) are inverse

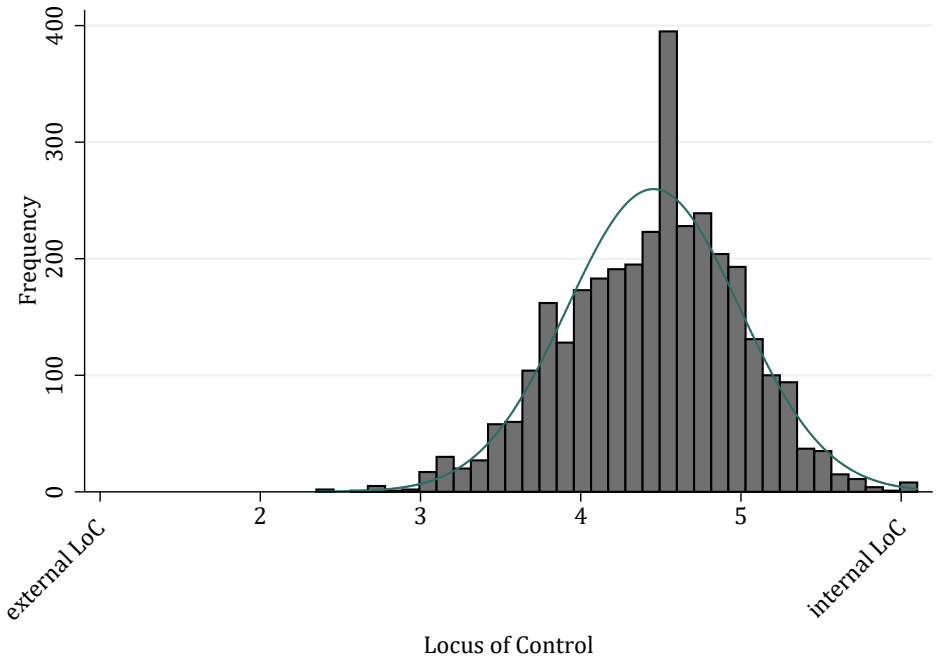
Locus of Control

The Locus of Control, as it appears in the questionnaire, is an indirect measure and has therefore all the limitations of indirect measures. It is a latent variable, which needs to be constructed of different items that measure this latent variable indirectly. Especially for personality traits, however, this is the most common approach, as discussed in chapter 2.4. Generally, a high number of items help to reach higher validity, however, at one point there is a trade-off between validity and the length of the questionnaire. The construct of Locus of Control can be seen as twofold, as a group of intrinsic and a group extrinsic attribution style items, as shown by Rotter (1966). The items can, however, also be used as one single scale whereas low extrinsic values show intrinsic attribution style and vice versa.

Locus of Control of the children is measured since the year 2000 in each of the waves (table 3.5). In 2000 to 2005 the items were surveyed on a scale from 1–'I completely agree' to 4–'I don't agree at all'. From 2006 onwards, the items were surveyed from 1–'I don't agree at all' to 7–'I completely agree'. To harmonise the scales, the older waves were inverted, and both, the new and the old scale, were linearly transformed to a scale from 1 to 7.

When looking at the distribution of Locus of Control, it is evident that it is shifted towards an internal Locus of Control (figure 3.2). The reason for this is presumably connected to a psychological effect called 'self-serving bias'. Mentally healthy people

Figure 3.2: Distribution of Locus of Control



SOEP main questionnaire, unweighted data
Locus of Control averaged over two time points per person (2005, 2010)

tend to overestimate their own influence on outcomes, even if the positive outcome is completely random or highly unlikely, which is demonstrated, for example, in the high number of people playing the lottery. Men usually show it more than women (Nelson and Beggan, 2004). It is just an example to remark that most personality traits tend be more frequently distributed towards the positive ends of the scales. This has no practical consequences for the analysis.

3.3.6 Supportive Parenting

For measuring the socialisation that children experience, a construct measured in the Youth Questionnaire is used. 'Supportive parenting' consists of nine items asked to the children about the perceived support of the parents. It measures how much attention, love and constructive communication exists between the parents to the children. A supportive parenting style has been found to lead to a healthy social and cognitive development of the child (Gerlitz and Schupp, 2005; Simons et al., 1992; Rutter, 1985). The items

Table 3.6: Items of Supportive Parenting

Item	Itemtext
How often does it happen that...	
1	your parents talk to you about thing that you do or that you have experienced?
2	your parents address things that upset or burden you?
3	your parents ask for your opinion before they decide on something that concerns you?
4	your parents show that they are happy when you do something that your parents like?
5	you can find a solution together when you and your parents have a problem with each other?
6	your parents give you the feeling that they really trust you?
7	your parents ask for your opinion before they decide about family matters?
8	your parents explain their decisions to you?
9	your parents show you that they really love you?

Source: After Weinhardt and Schupp (2011, p. 17)

were originally coded 1–'very often', 2–'often', 3–'sometimes', 4–'rarely', 5–'never'. For the analysis all items were inversely and linearly transformed from 1–'low supportive parenting' to 10–'high supportive parenting' (table 3.6).

Controls

Control variables are used depending on the necessity for the model. Age in years is used and from this, age squared, to model a nonlinear effect. Age is related to the level of qualification. Older cohorts tend to have lower levels of education, as mentioned above. Furthermore, age is related to income. Most persons have an increase of income over the life course. Even though research results are not consistent across studies (see section 4.1) it cannot be excluded that there is a systematic pattern of personality by age, also in an interplay with other variables. Of course, this only applies to the adult sample, as the youth sample consists only of 17-year-olds. They cover, however, almost a whole generation born from 1983 to 1994, the year of birth is considered for the same reasons.

Gender is coded 0 for men and 1 for women. There are countless studies about differences in education and income (Blau and Kahn, 2016, 1997; Budig and England, 2001; Schuhrer et al., 2015; Selezneva and Van Kerm, 2016; Weichselbaumer and Winter-Ebmer,

2003, e.g.) across genders. Also for personality systematic differences between genders with regard to labour market returns have been found (Mueller and Plug, 2006). This underlines the necessity to add gender as a control variable. Family status is coded 0 for not married and 1 for married. Also self-selection into marriage is connected to personality (Dupuy and Galichon, 2014), as it is for education (Blossfeld, 2009; Hamplova, 2009) and income (Blossfeld and Drobnic, 2001; Kalmijn, 1991). To avoid systematic biases in the models, marriage status was added to the models.

Some models were estimated including the Erikson-Goldthorpe Class Scheme (EGP) and the monthly household net income in addition to the parental education, as mentioned above. The EGP was simplified by collapsing inactive persons with unskilled with farm workers, all types of self-employment, and routine manual with service-sales workers each into a new category.

Descriptives for all variables, distribution of personality over school and income groups, as well as the gender distribution of selected variables and correlation tables can be found in the Appendix table A to figure B.

4 The Effect of Personality on Education and Labour Market Outcomes

This chapter is dedicated to the first research question, to what extent personality affects education an labour market outcomes. First, it provides an overview of the history of personality research. This comprises a section on stability of personality over the life course, discussing the state of the art in this area of research with a literature review. The overview is helpful to understand how personality could affect education and labour market outcomes in different ways, because they take place at different stages of the life course. This leads to the second section, where the focus lies on the demands in education and labour market on personality of children, adolescents and adults. In this context, the German school system is explained, because the data for the analysis is data for Germany. Finally, the last theoretical section is a literature review on previous research on personality and education and labour market outcomes at different stages of the life course.

The empirical part of this chapter first examines the direct effects of different personality traits on school outcomes, more precisely on school placement (lower, intermediate and upper secondary schools) and performance (maths grades). Next to bivariate analyses, testing differences in personality across school types, Structural Equation Modelling is applied to analyse the effects of personality on school outcomes taking into consideration that personality traits are latent variables. The second empirical part is dedicated to

the effects of personality on income, as a labour market outcome, and vice versa. Here, a research gap is addressed as to what extent there is a reciprocal effect of income and personality traits. Examining reversed causality between education personality is of secondary interest for two reasons: Firstly, for adults, education is in the vast majority of cases a time-invariant variable, i.e. once the highest degree of education is reached, people rarely attain more formal education, in the sense of state certified degrees. In terms of panel data analysis, a time-invariant variable cannot affect a time-variant variable, in this case personality, unless there is an interaction effect of that time-invariant variable with a time-variant variable such as time itself. However, so far this has not been a research interest due to a lack of possible mechanisms for this relationship. Income on the other hand, does change over time and, as discussed later on, is expected to influence personality. Secondly, the question of whether education influences school outcomes would be interesting if there was longitudinal data on personality for children and their school outcomes before they finish education, but so far there has been none.

4.1 Stability of Personality Over the Life Course

So far, there have been several empirical longitudinal studies about personality development, especially in fields of developmental psychology and pedagogy, but in terms of theory, there is no sociological life course theory of personality development and its effect on life course relevant outcomes in educational and labour market research. Under a 'life course theory' an integrative theory is denoted, that comprises the development of personality throughout the whole life course and not only single stages. Moreover, it sets the results of previous studies of single stages into a comprehensive whole. This section discusses the development of personality over the life course, to prepare for the next section which connects personality traits with stratifying systems with which individuals are confronted during the life course, school and labour market. It must be assumed that in different stages of the life course, different personality traits are important. Some groups, e.g. women vs. men, might have personality traits that meet the demands of educational

and labour market systems differently. As a result, some persons with certain personality types will be more successful in the stratifying system at different stages of the life course than others. Under these circumstances the effects of personality traits are theoretically not exactly predictable. This will have consequences on the hypotheses of the following analyses.

The views on the development of personality differ in various ways. Neyer and Asendorpf (2001) discuss two extreme views. The essentialist perspective concentrates on the genetic setting that influences personality characteristics and other noncognitive skills, but also views of life such as life satisfaction. On the other hand there is the contextualist perspective, which believes that environmental and situational factors influence noncognitive skills, e.g. socialisation or life events. More modern views assume a gene-environment interplay (Specht et al., 2013; Roberts et al., 2008; Shanahan et al., 2008). Other research assumes that personality is developed in early childhood (Costa et al., 2000; McCrae and Costa Jr., 1999; Costa and McCrae, 1994) and becomes more stable during adulthood. More specifically, there is high discontinuity in personality from early childhood (about three years) to adulthood (about 30 years), but high continuity during adult life. Moreover, researchers found that personality traits develop over the whole life, until the age of 50 (Specht et al., 2013; Roberts and Jackson, 2008; Roberts et al., 2008; Caspi et al., 2005). All in all, the research by Caspi, Roberts, and their collaborators point towards stability during adult life and less stability in early life and higher ages. In other words, there seems to be a U-shaped relationship in stability of personality characteristics. However, all of the studies so far only show snapshots of life stages. None of them follows up persons over their life course due to the absence of life-long longitudinal data. To set up a convincing life-course theory longitudinal data is necessary, especially where it is rarely measured, in childhood, adolescence and in older ages. To confirm such a theory is not possible with the present data.

Another factor on the stability of personality are critical life-events, which can cause a variation of personality characteristics. This suggests that personality is also shaped by external factors such as unemployment or divorce. However, it seems unlikely that a

complete change of personality happens due to life events (Specht et al., 2013; Wortman et al., 2012; Mirowsky and Ross, 2007). Moving away from the psychological views, Helson et al. (1984) takes a sociological point of view hypothesising personality to be shaped by social roles in different life phases, which is an argument for the malleability of noncognitive skills, because the development of personality depends on the varying variable of changing social roles.

There is an ongoing discussion about the stability of personality, especially regarding life course events. Costa et al. (2000) found personality to be rather resistant towards life course events. Magnus et al. (1993) also found personality to be rather stable, and their results indicated personality predicting life course events, rather than the other way around. However, it needs to be considered that their panel covered a time span of 4 years only. Furthermore, they found a trend of individuals experiencing negative life events to experiencing even more negative life events. Their panel contained only adults, which leads to the conclusion that previous negative life events before adulthood could have taken place already, and started a self-reinforcing process. The mechanism of reciprocity between personality and life events will be empirically examined in more detail with the example of income in section 4.5.

4.2 Stratifying Systems and Their Demands

The stratifying systems examined in this study, are school outcomes at the age of 17 and the labour market. Theoretically however, the differentiation already starts in kindergarten, when socialisation with individuals outside the family begins. During this time, children receive feedback from the behaviour, judgements and treatments of teachers, peers and parents. Following the majority of developmental theories, most of their later personality traits are developing during this period (Caspi and Roberts, 1999). In this phase, basic social competences and self-control are of crucial significance. Since children have comparatively low cognitive correction processes, the stage of personality development directly affects behaviour and therefore positive or negative feedback by the

environment. The demands in kindergarten are mainly pro-social behaviour, to control the self within a group and to be considerate of the needs of others, as well as the drive, or 'motivation', to explore new things and activities, such as arts and crafts, singing, or games and toys (Caspi and Roberts, 1999). The challenge in examining this is that motivational factors and self-esteem are difficult to measure, because they are hardly visible at this age. There are few longitudinal studies of small children and their personality development. Often the effects found are zero or rather small compared to group differences in later life. The question arising from these results is whether there are no differences in this early life stage or whether there are differences, but they are just so small that the instruments are too imprecise to capture them. Furthermore, due to a lack of data containing bi-generational information of both, parents' and kindergarten aged children's personality, this could not be examined in this study.

In school the demands of the environment of children become more complex. Not only in terms of social behaviour and motivation, but also traits that help children to show favourable behaviour in the classroom and in exams. Zelenski et al. (2012) found extravert behaviour gaining more sympathies among others, even when the introverted only pretended to be extravert. They make a strong point in their paper for Extraversion being a favourable personality trait. Moreover, traits such as self-esteem, Locus of Control and motivation play a central role in the success of pupils. They regulate the behaviour in and out of the classroom as well as the effort and achievements needed for scholastic success (Rosen et al., 2010). Teachers judge children not only by their actual academic achievement, but also by their behaviour in the classroom. Adaptive behaviour in the classroom means being attentive and quiet during the lessons and now it is additionally expected that they be motivated and ideally actively participating in the lessons. The older the children, the more basic social competences are seen as self-understood and the more important become skills of self-control and self-motivational factors (Coleman et al., 1966; Prociuk and Breen, 1975).

For tertiary education, it is expected that personality traits have already been developed, although it must be considered that young adolescents are still undergoing major

life changes. Personality traits now differ visibly between individuals and are easily measurable with common questionnaires. As discussed below, differences in success can be explained by differences in personality. The same is true for labour market entry, where the positioning on the labour market depends on individual characteristics, even when considering personal resources, education and social contacts. It is assumed that the personality is now fully developed.

Success in each stage of the life course, or respectively, in stratifying institutions depends on behaviour resulting from an individual set of personality traits. Personality is partly inherited and partly acquired through parents and the social environment. If personality differences contribute unevenly to success, personality should differ systematically across different social groups, more concretely different educational levels of the parents. To what extent the influences of certain personality traits affects educational and labour market success and the role parental personality and care-taking play, is studied in this thesis in chapter 6.

4.3 The German School System

The German school system, is, in an international comparison, one that determines, which level of education children are going to receive at a very early stage. While children with low grades (C and worse or respectively 3 or higher in the German system) are channelled into the lower secondary track (five years), where their further options are either unqualified work or vocational training for manual jobs, children with average grades (B-C or respectively 2-3) are send to intermediate schools (six years), where they become qualified for vocational training for lower and intermediate white-collar jobs. However, both tracks do not lead to degrees qualifying for higher tertiary education in universities. Only the highest track, the Gymnasium (eight to nine years), leads a degree allowing to access to the universities. There is the option to continue school education in the next higher track after receiving the first degree, however, the system is relatively impermeable, compared to other countries. This means, the first tracks ascribed is most

likely the track they will stay on. Due to the tight connection between education and the labour market, schools channel children very early into their future socio-economic position.

For a long time, Germany was the role model of a conservative schooling system with high preservation of social structure due to this early channelling. In the last decade, some German federal states have (or have tried to) introduce comprehensive schools instead of the traditional tripartite system of lower, intermediate and upper secondary schools. However, the structure of the traditional schools is still prevalent, not in terms of having different schools, but in the differentiation by classes within the school. Like the system of the United States, students attend classes depending on their level in different subjects. In the United States this leads students from more advantaged backgrounds to attend classes that are specifically designed to prepare them to college (Schuehrer et al., 2017).

In Germany, school education is generally free of charge, i.e. schools do not claim fees. Material costs for families primarily come about for the prolonged time of children staying in school without own income. This causes especially high costs when young people decide to study at a university, in contrast to vocational training, where the employer pays a wage to the student. Private schools charging fees are rather rare in Germany. Only 5.5% of all students in 2012 were enrolled in private institutions. Even though the trend for private education is rising, it has not become a particularly important factor in accessing higher education in Germany (OECD, 2013, p. 408). Furthermore, out of this 5%, the majority are church based private schools, that charge no or very low fees. Admission to universities mostly depends on the school qualifications obtained. Furthermore, selection criteria for universities are usually the grades obtained in the last years of schooling, so that the formal fact of visiting a private school does not play a role in the access to higher education, leaving outside quality differences in public and private schools.

4.4 Previous Research

Cognitive performance is seen as one of the strongest predictors of educational attainment and therefore we must consider the effect of personality on cognitive performance in discussion. Noncognitive skills can be assumed to 'establish and regulate the direction, duration, intensity, range, and speed of cognitive functioning as well as its initiation, maintenance, disruption, and termination' (Messick, 1996, p. 354). However, there is little empirical evidence for this assumption. Borghans et al. (2008b) examine the effects of noncognitive skills in general such as performance motivation and internal Locus of Control on cognitive test outcomes via an experimental design on 128 Dutch students. Noncognitive traits were measured under varying conditions: time limits (influencing perceived pressure and bottom-up and top-down decision making), and external incentives in the form of money offered. An IQ test was conducted before the experiment. Results suggest that favourable character traits such as high internal motivation, low fear of failure, curiosity and internal Locus of Control have a positive effect on IQ outcomes. Also, highly intrinsically motivated people were less sensitive to financial (external) incentives.

In another study Kulatunga-Moruzi and Norman (2002) investigated the effects of cognitive and noncognitive dimensions on predicting the success in a licensing application procedure of the Medical Council of Canada, a cognitive test, and found no effects. Noncognitive skills seem to have almost no effect on success in cognitive test scores here, but the authors assume this to be a measurement problem with the validity of measuring noncognitive skills through interviews, as is done in normal application processes. In sum, only a few noncognitive traits are found to influence cognitive performance. Almlund et al. (2011) summarise that personality influences crystallised knowledge, i.e. learned or acquired skills and knowledge like in test scores (p. 65), while it has no effect on fluid intelligence. While there is extensive research in the field of psychology in isolating single effects of traits on performance in various ways, not much research has been done in a context of social background, neither among psychologists nor sociologists and economists.

4.4.1 Pre-School and Schooling Years

DiPrete and Jennings (2012) assess the effects of social or behavioural skills on educational outcomes such as reading abilities and mathematics. Results show that girls outperform boys in social skills and that this positively affects their academic outcomes in both maths and reading. The time span of the analysis covers pre-kindergarten to schooling year 5, and the strong gender differences persist through all age classes. In another study, Van Eijck and De Graaf (2004) find an impact of the Big Five on educational attainment. All five dimensions have significant effect; while Conscientiousness, Neuroticism and Openness to Experience have positive effects on educational outcomes, Extroversion and Agreeableness have negative effects. The effects are the same size for boys and girls except for Openness, which has a larger effect for boys. The negative effects of Friendliness are unexpected and hard to explain, since attributes like cooperativeness, pleasantness or agreeableness are expected to have positive effect on social behaviour and therefore on educational outcomes. A review by DeRaad and Schouwenburg (1996) summarises research on personality traits in educational research. Most studies show that there is an effect of character traits on school attainment, but results are not consistent for all character traits evaluated.

Motivation, especially intrinsic motivation, is one of the strongest noncognitive predictor of educational attainment (Rosen et al., 2010). Studies in this review do not show coherent patterns of structure and measurements, however, even when motivation is defined and measured differently across studies, it usually has a positive effect on educational attainment. Also, many of the studies lack important control variables. Rosen et al. (2010) provide a very useful collection of psychological studies done in the fields of motivation, effort, self-regulated learning, self-efficacy, academic self-concept, antisocial- and pro-social behaviour, and coping and resilience. The results of these studies consistently find associations between noncognitive attributes and academic outcomes. However, a publication bias in this review needs to be considered.

4.4.2 University

For the tertiary level De Fruyt and Mervielde (1996) describe the impact of the Big Five on educational choices and educational outcomes. There are major differences in students' characteristics by subject of study. For example, they find that students in social sciences and humanities are more emotionally unstable and have higher scores on Openness to Experiences. They find major gender differences in the effect of personality on educational attainment, a difference that is partly explained by subject choice. In the same volume of this special issue, Blickle (1996) analyses personality structures and learning strategies with regard to performance of college students. Results indicate that certain personality traits, mainly Openness to Experience and Conscientiousness, influence different learning styles that, in turn, are more or less responsible for learning success. Jacob (2002) finds that there are no gender differences with regard to cognitive skills or social background, but that a gender gap for noncognitive skills exists. The effect of noncognitive skills also persists after controlling for previous educational attainment. Controlling for noncognitive skills, the gender gap is reduced by about 40%. A strong point of this study is the use of panel data which is rarely found in this area of research. The panel data enables access to the direction of effects over time, which give indications for causal effects. These findings indicate that it is personality that affects educational attainment instead of educational attainment leading to personality changes. However, the latter was not explicitly tested, and so reciprocal effects cannot be excluded.

4.4.3 Labour Market

Some hints on the theoretical mechanisms of the effects of personality on career success were elaborated by Judge and Kammeyer-Mueller (2007). Personality influences social behaviour, the choice of jobs held and job performance. This leads to certain job features that cause career success, e.g. through income. As in most studies, the influence of personality traits on career success is ambiguous. Some traits show definite influence while others are shown to have indistinct results. Judge et al. (1999) find a strong

influence on intrinsic and extrinsic career success in their study while controlling for general mental abilities. For Conscientiousness they discover positive effects on career outcomes, while they find negative effects of Neuroticism. Evidence from a sibling study is given by Fletcher (2012). Holding attractiveness, cognitive abilities, occupation and other factors constant, the author finds strong evidence for the effect of personality on earnings. These income effects of noncognitive factors seem to be robust over cohorts (Blanden et al., 2007).

Based on German data, Flossman et al. (gust) analyse wages concentrating on perceived life control, success, achievement, and self-esteem. Findings suggest a positive effect on wages. Heineck and Anger (2010) examine with the same data the effect of various noncognitive traits such as the Locus of Control and the Big Five personality traits on wage premiums. Using Random Effects estimators on two waves, they find that openness is rewarding for females but punishing for males. Extraversion is found to have a negative effect on labour market outcomes. Internal Locus of Control is positively associated with wage premiums. Similar findings were found by Cobb-Clark and Tan (2011) for Australian data. Segal (2008) showed the importance of motivation in her study. Next to that, there is a positive effect on earnings of motivation and leadership qualities (Segal, 2008; Kuhn and Weinberger, 2005). Fietze et al. (2009) showed that personality has significant effects on self-employment. Self-employed people are emotionally more stable, more open to new experiences, more conscientious and more agreeable to employees.

To get an overview of this area of research, the meta-analysis of Barrick and Mount (1991), focusing on the Big Five and job performance should be consulted. Findings suggest that Conscientiousness was a general predictor of job performance, while Extraversion and Openness to Experience were significant predictors only in some occupational groups. Bowles et al. (2001) demonstrated in their paper that noncognitive skills have an even bigger effect than parents' socio-economic status and schooling under control of cognitive skills. They also point out the importance of noncognitive skills when it comes to the determinants of earnings. Jackson (2006) identifies personality traits affect the likelihood to enter the salariat, or middle class, but also that different types of traits (she focuses

on aggression and withdrawal) differ in their effect, depending on the occupation and on how relevant the personality traits are for the work being carried out. For example, she finds a negative effect of withdrawal on entry to the managerial salariat subgroup, an occupation in which communication and interactions are highly important. In turn, passivity was reported to be an advantageous personality trait for entry into the higher technical subgroup, in which interactions are less important. According to her micro-level explanation, employers reward personality traits which are valuable in the job and cannot be measured directly through cognitive abilities.

Cunha and Heckman (2008) focus in a very elaborate study on the determinants of the evolution of noncognitive and cognitive skills over the life cycle of children by using dynamic factor models. Parental input affects noncognitive (and cognitive) skills, and this effect varies by the age of children. By simulating the effect of a 10 percent increase of parental investment at different stages of the life cycle of the children on log earnings at age 23, they find parental investment operating primarily through its effect on noncognitive skills. Heckman and Mosso (2014) review the recent economic literature on human development through the early life course. Personality skills can be shaped through adolescence and early adulthood although economic returns to programs in a later life stage show smaller returns compared to earlier ones. Nevertheless, personality skill such as self-confidence, teamwork ability, autonomy, and discipline can be improved by workplace-based programs and mentoring programs in school. However, they stay very vague on how this would affect social structure or its generational replication (p. 4). In both studies, Cunha and Heckman (2008) and Heckman and Mosso (2014), possible effects of the Big Five, Locus of Control or personality in general are neither analysed nor discussed.

4.5 Effects of Personality on Educational and Labour Market Outcomes

Due to the lack of general theories about the effects of personality on educational attainment, it is rather difficult to formulate precise hypotheses from a sociological point of view. Furthermore, one must assume that personality traits are, as discussed above, interacting with different situations. More than a general theory, individual theories for each trait are applicable, however, these hypotheses usually do not consider an interdependence of personality traits within a person. While a general theory is not available, it is possible to build on the results of previous psychological research and take them as a base for reasonable modelling, as well as to formulate certain expectations about the results and possible mechanisms. The idea behind personality affecting educational and labour market success is personality as an action guiding entity. Depending on the layout of personality traits, people have individual preferences and motivations for acting. The results of this behaviour are then either advantageous or disadvantageous in this particular setting, which, in this case, would be the education and labour market context. As a result, different personality traits favour a corresponding different reaction within the same situation. Thus, persons with different personalities act differently in the same situation.

The first step to understanding the relationship between socio-economic background, transfer of personality and educational and labour market outcomes, is to assess the effects of personality traits on educational attainment and labour market outcomes for each trait individually and, secondly, taken as one entity, the set of traits that forms the personality as a whole. This analysis takes an exploratory approach on answering whether personality traits affect school and labour market outcomes. The hypotheses should be understood as expectations on the outcomes based on previous research and not as theoretically derived hypotheses in a classical sense.

4.6 Effects of Personality on School Outcomes

Openness to Experience

Openness to Experience is the most intellectual dimension of the Big Five. It deals with experiences of arts and new learning experiences as well as creativity. Openness to Experience is supposed to mirror joy in making new (learning) experiences and the ability to absorb new knowledge. McCrae and Costa (1991) found Openness correlated to a higher degree of intelligence and intellect (pp. 831). Busato et al. (1998) found Openness to be negatively correlated with so-called 'directed learning styles' and positively correlated with learning styles that eventually lead to better education outcomes (Busato et al. 1998, pp. 130). More specific in terms of educational attainment, Paunonen and Ashton (2001) found positive effects of Openness, particularly on subjects requiring a high amount of imagination and self-motivation of exploration topics, mostly language and applied sciences. Similarly, O'Connor and Paunonen (2007) found positive correlations between Openness and academic outcomes in the post-secondary sector. With regard to test scores (SAT verbal scores, an American standardised cognitive test primarily for college applicants) and the grade point average (GPA, the average final high school grade), Noftle and Robins (2007) found Openness to have positive effects on the two outcomes. Following the clear majority of previous research results, I expect Openness to Experience to have a positive effect on educational attainment (A1).

Conscientiousness

Conscientiousness is a dimension of how dutiful and responsible someone is, also with respect to self-control. Furthermore, being tidy and working efficiently means being well adapted to the needs of the schooling system. Conscientiousness helps students with steady learning and organising themselves. DeRaad and Schouwenburg (1996) summarise it like this:

> Obviously, [...] conscientiousness is the trait that is drawn upon as a main psychological resource in learning and education. It covers the drive to accom-

> plish something, and it contains the characteristics necessary in such a pursuit: being organised, systematic, efficient, practical, and steady [...] (p. 325).

Results of past studies support this claim.

Evidence from a longitudinal study by Chamorro-Premuzic and Furnham (2003) indicate positive effects of Conscientiousness on different academic outcomes, such as performance in exams and lower rates of absenteeism. Attendance was also a topic of the study by Conard (2006). The author found a direct effect of Conscientiousness on the GPA, even when controlling for the SAT. However, the effect was completely mediated when controlling for attendance of the students. Dollinger and Orf (1991) studied the effects of Conscientiousness and Openness on several educational outcomes such as test performance and grades. However, against most other research results in this area, they found no effects for Openness but significant positive effects for Conscientiousness. In contrast, Busato et al. 1998 found in their study the same positive effects for Conscientiousness as for Openness, as discussed above. Similar results were found by Heaven et al. (2007) for Australian students, however the effect of Conscientiousness did shrink considerably after controlling for gender actual ability. Nevertheless, they found significant positive effects on school outcomes over a one-year span with changes in Conscientiousness. Among personality traits, Conscientiousness – excluding Locus of Control – is most likely one of the best predictors for school success. Therefore, also for this study, a positive effect of Conscientiousness on educational outcomes is expected.

Extraversion

Extraversion could lead to better educational attainment since it leads to more active behaviour towards other social contacts. These contacts can be used as a stepping stone to better grades, such as teachers. This behaviour can also directly lead to better oral grades due to higher classroom participation or indirectly to more active learning behaviour. On the other hand, Extraversion could also lead to more active behaviour in a negative way by being unfocused and counterproductive. It could have negative effects on classroom behaviour, for example by displaying obtrusive or aggressive behaviour.

Therefore extravert behaviour should especially have a positive effect with other sociable characteristics. Furnham and Chamorro-Premuzic (2004) summarise previous findings in the context of different educational stages: Extraversion has been found to influence primary school outcomes positively, because in primary school sociability and a low level of competitiveness are valued the formal setting of secondary school (e.g. Entwistle and Entwistle, 1970) and university. This hints toward a negative effect of Extraversion on school outcomes. However, they point out that this effect could be due to self-selection of the less competent persons becoming more extravert over time (Anthony, 1973). Extraverts are shown to take higher risks, making errors in conversations and to be more talkative (Matthews, 2009). Therefore, they have been shown to be better at short term memory recalls and dual-task version, but introverts perform better at long-term recall tasks (ibd.). Previous research does not agree on the effect of Extraversion on educational outcomes There is no sufficient evidence to assume whether Extraversion affects school outcomes positively or negatively (A3).

Agreeableness

Similarly to Extraversion, previous results of Agreeableness on educational outcomes are not uniquely pointing towards positive or negative effects on schooling outcomes. High Agreeableness, 'the degree to which a person needs pleasant an harmonious relations with others', as defined by (Borghans et al., 2008a, p. 136), should lead to pro-social behaviour and therefore to better social relations with other school pupils and teachers. This pro-social behaviour could increase social capital and should therefore results in better school outcomes. However, most studies found no effect of Agreeableness academic performance or achievements (e.g. Busato et al., 1998; Entwistle and Entwistle, 1970). Noftle and Robins (2007, p. 118) reviewed 20 studies on personality and academic outcomes on a college level and found in only three of them weak positive effects of Agreeableness, while in the other 17 studies no significant effects were found.

The theoretical view as set up by Borghans et al. (2008) suggests a positive effect of Agreeableness on school outcomes, which is partly supported by some few empirical

studies. On the other hand, the majority of empirical studies show no effect of Agreeableness on school outcomes, however leaving these results without theoretical explanation. Theoretical considerations such as from Borghans et al. (2008) support Agreeableness to have positive effects on school outcomes, Empirical evidence for this is scarce. Most studies found weak or now effects. The expectation for this study joins the findings of previous studies that Agreeableness has a weak or no effects on school outcomes (A4).

Neuroticism

Neuroticism is expected to have a negative effect on educational performance. As discussed in section 5.1, Neuroticism, that is, the degree of emotional instability, is often connected with depression and unhappiness. Also, neurotic people tend to, partly unconsciously, anticipate negatively or avoid social situations, because they might pose a possible threat to them (Dumfart and Neubauer, 2016; Matthews et al., 2000; Matthews, 2009). However, Matthews et al. (2000) noted: 'Anxiety is occasionally associated with improvements in performance, on tasks such as easy paired-associate learning, perhaps because it has a motivating effect' (p. 271). This effect, however, lead anxious persons to improve performance in manipulated test situations, but in absolute terms they still fail to keep up with the performance of persons with a low level of anxiety (p. 278). The few previous studies predominantly support this assumption. Entwistle and Cunningham (1968), for example, found children to perform better in school than their peers, when showing a high degree of emotional stability, i.e. scoring low on the Neuroticism scale. Neuroticism is expected to affect school outcomes negatively (A5).

Locus of Control

In terms of educational success, the most widely studied trait is the Locus of Control. It has been found to have direct and indirect positive effects on educational attainment. The indirect effects are referring to higher self-esteem and higher self-efficacy (Judge et al. 2003). The direct effect consists of the thought of control itself improving performance. As discussed in the literature review, Locus of Control is expected to have a positive

effect on educational attainment (A5).

4.6.1 Methods for Analysing Personality and School Outcomes

Following the analysis of parental effect on school and labour market outcomes, this chapter focuses on the effect of personality. Structural Equation Modelling (SEM) is used to examine the effect of the constructs of personality on school and labour market outcomes (Big Five and Locus of Control) as a whole, as well as taking into consideration the single traits defining these constructs. SEM allows modelling the complex relationship between unobserved (latent) variables in an authentic way. Skrondal and Rabe-Hesketh (2004, p. 1) define

> [...] latent variable as a random variable whose realisations are otherwise not visible. This is in contrast to manifest variables where the realisations are observed' Instead of building indices that measure personality traits as an average of an item battery, latent variable modelling adequately mirrors the unobserved construct influencing the observed measurements. This way, the effect of each factor can be made visible and goes in to the model with its own adequate weight. This is of particular interest in personality research due to the complexity of the constructs (Almlund et al., 2011, p. 75). Each item is directly part of the model and not, as in other methods such as using indices, the representation of [...] transformations or geometric features of the data and not elements in a statistical model. (ib., p. 6)

Similar to categorical variables in regression models, also in latent variable modelling there must be a reference category, too, for all of the factors of a latent variable. Whenever an exogenous latent variable is modelled, one estimate of the observed variables needs to be set to 1, otherwise the model will not be identified. Which of the paths is set to 1 is irrelevant; the estimates for the rest of the models will be the same. For estimation the STATA 14 module on SEM is used, implementing Maximum Likelihood with Missing Values (MLMV). In general, for modelling and re-specification, I followed the guidelines

of Long and Bollen (1993). To reach identification of the models, error terms of the measurements are set to 1, which implies all of them (within a model) are equal (Hox and Bechger, 1998).

First, an analysis of each personality trait on educational outcomes is conducted to see their absolute effects (figure 4.1). Then a model that includes all personality traits is estimated (figure 4.2). The second analysis is the more appropriate if one would like to look at the predictive power or causality, however if one wants to learn about the size of the effects of personality traits, the previous analysis is of major importance. An illustrative example: When looking at the gender wage gap, we first want to know how big the gap between women and men really is. Only after that we start to look on it again by controlling for other factors. Many researchers put all personality traits into one model and start interpreting the effects, not mentioning or considering that personality traits are not independent from each other.

Looking at figure 4.1, the effects of personality traits is modelled as latent variables on educational attainment. Item 11 to Item 1x are the actually measured items belonging to the latent variables Locus of Control, Openness to Experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism.

The first outcome is the probability of attending (or having attended) one of the three school types at the age of 17. The variable was recoded for this analysis into three bivariate dummy variables. The first one is to attend lower secondary school versus intermediate and upper secondary school. The second is to attend intermediate secondary schools versus lower and upper secondary. Accordingly, the last variable indicates the probability of attending an upper secondary school versus lower and intermediate secondary schools. This estimation was conducted for each dimension of personality traits for each school type dummy, which results in a total of 18 models.

The second dependent variable is the last measured grade in maths, modelled as dependent endogenous variable. The epsilons (ϵ) are the error terms for each endogenous variables, where the numbering follows the numbers of endogenous variables.

Figure 4.1: Schematic SEM for personality and school outcomes with single latent variable

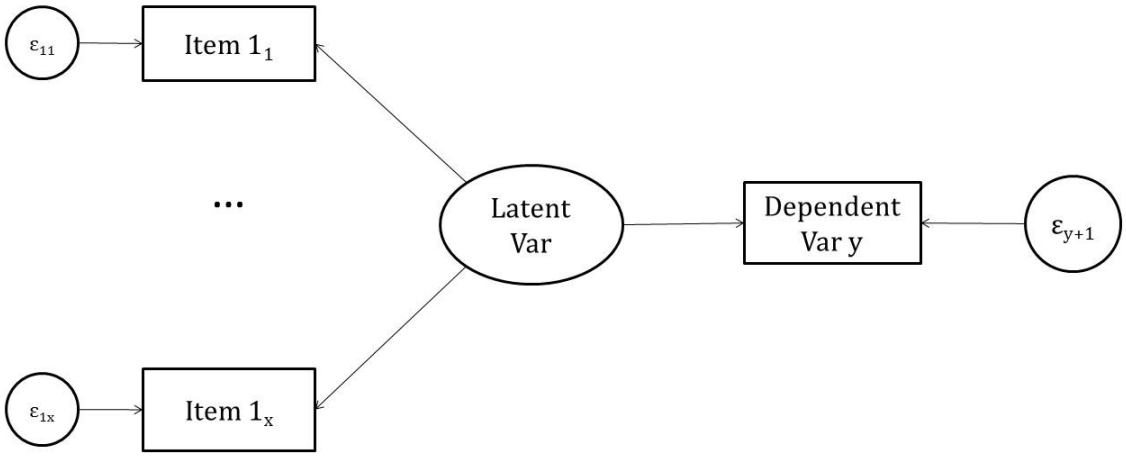
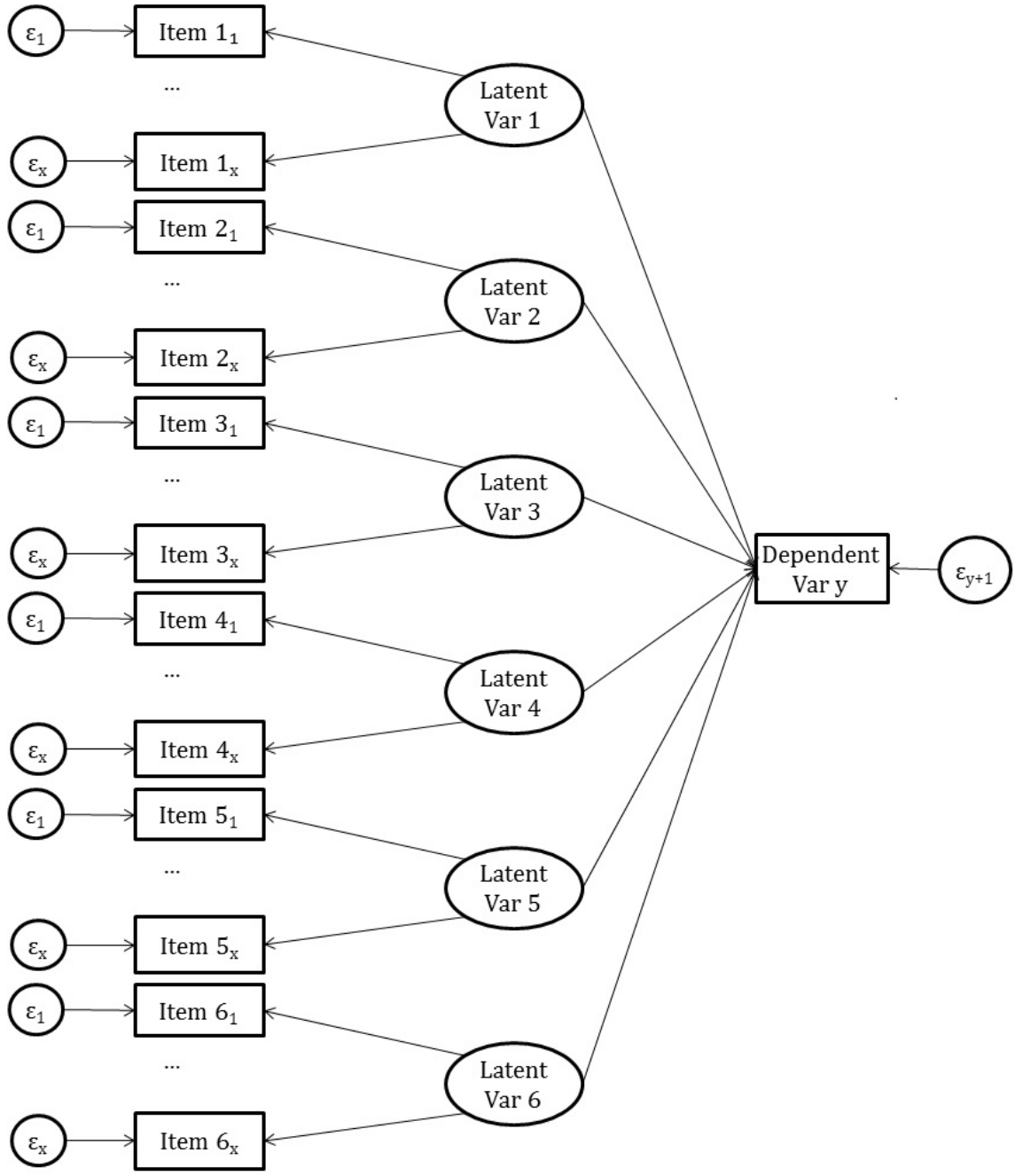


Figure 4.2: Schematic SEM for personality and school outcomes with all latent variables



Because of the tripartite nature of the German school system, the analysis for maths grades was split again into three different groups: lower secondary (Hauptschule), intermediate secondary (Realschule) and upper secondary (Gymnasium) school. Children visiting a comprehensive school were coded into one of the categories by using the information about the the highest qualification reached. The case numbers were 179 for the lower secondary, 302 for the intermediate and 517 for the upper secondary. The numbers stay constant over the analyses because MLMV is used as an estimator, as described above. As in the previous analysis the models were calculated again for each dimension of personality traits and grades within school types, which results again in 18 models. All models are additionally controlled for gender and year of birth of the children. Maximum Likelihood with missing values is used as estimation method. Cross-sectional sample weights are used. Since robust standard errors are estimated, only the coefficient of determination can be estimated and reported as overall measure of goodness-fit.

4.6.2 Results for Personality and School Outcomes

Achievement Through Control Beliefs – Personality and Educational Achievement (School Placement)

Table 4.1 presents the means of all six personality traits across school types, followed by a one-sided t-test for independent samples. The t-test was conducted jointly for lower and intermediate secondary schools against upper secondary. The reason behind this is that there were no significant differences between children from lower and intermediate secondary schools, but for both differences to children from upper secondary schools. The means for personality traits are the average of valid answers from all three items each per Big Five dimension and from nine items measuring Locus of Control. The results indicate three significant mean differences. Openness for Experience is significantly higher for children attending an upper secondary school ($M = 4.86, SD = 0.05$) to children attending lower and intermediate secondary schools ($M = 4.55, SD = 0.04; t(1174) = -4.74, p = 0.00$). The mean of Locus of Control is significantly higher for children attending an upper secondary school ($M = 4.89, SD = 0.02$) than for lower and intermediate secondary

schools ($M = 4.79, SD = 0.02; t(2683) = -3.70, p = 0.00$).

These results give a hint why most publications about these personality traits are restricted to Openness for Experience, Conscientiousness and Locus of Control. They seem to have the clearest effect on school outcomes and therefore reliably produce significant results. This has lead in the past to a negligence of the other traits in terms of closer examination and possible suppressors. A suppressor variable is a predictor that increases the explanatory power of another explanatory variable, by suppressing irrelevant parts of its variance. Suppressor effects are rarely found in sociological research, both theoretically and empirically. In personality research it is a much more likely phenomenon to appear due to the close and complex connection of personality traits. It is sensible to believe that two or more confounding variables appear in a multivariate model of which one independent variable captures large parts of another independent variable. In the following, also the personality traits that did not show significant differences across groups will be examined in multivariate and latent variable models as this has been neglected in the past.

Finding no significant differences between children visiting lower and intermediate secondary school has effect on the multivariate analysis. The cut in personality difference lies between upper secondary students and the rest. Consequently, the multivariate analysis concentrates on the comparison between these two groups.

The coefficients of each personality trait on the type of school attended is presented in table 4.2 [1], following the model shown in figure 4.1. Here, only the coefficients and significance level of the latent personality trait on attending a school type are presented. The complete tables with all coefficients and covariances are documented in the appendix (table J – table O).

Conscientiousness increases the chances of attending upper secondary schools and decreases the chances of being in lower secondary schools in contrast to lower or intermediate

[1] SEM estimating school outcomes as multinomial outcome instead of sets of binaries were estimated but yielded similar results: There are no significant differences between lower and intermediate schools. Estimating models with binary outcomes, relaxes assumptions of the model, is more parsimonious and easier to interpret.

secondary schools. Extraversion increases the chances of attending an upper secondary school, however only at a 5% level. Having a tendency for an internal Locus of Control increases the chances of attending an upper secondary school. For Openness for Experience, Agreeableness, and Neuroticism no effect was found on school placement.

Table 4.1: Personality traits on school placement (upper vs lower and intermediate secondary school, models separate for each personality trait (summarised results), SEM, MLMV estimation

	Lower and Intermediate			Upper			Mean Difference		
	Obs	*Mean*	*Std.Err.*	*Obs*	*Mean*	*Std.Err.*	t	$Pr(T < t)$	$Pr(T > t)$
Openness	601	4.55	0.04	575	4.86	0.05	−4.74	0.00	–
Conscientiousness	601	4.88	0.04	575	4.78	0.05	1.54	–	–
Extraversion	601	4.92	0.05	575	4.90	0.05	0.22	–	–
Agreeableness	601	5.33	0.04	575	5.36	0.04	−0.45	–	–
Neuroticism	601	3.90	0.05	575	3.86	0.05	0.56	–	–
Locus of Control	1468	4.79	0.02	1217	4.89	0.02	−3.70	0.00	–

GSOEP Youth Questionnaire

Big Five waves 2006–2011, Locus of Control waves 2001–2011

'–' indicates no significant difference

Table 4.2: Personality traits on school placement of secondary school, set of binary models of all possible binary pairings, models separate for each personality trait (summarised results), SEM, MLMV estimation

	Lower vs other		Intermediate vs other		Upper vs other	
	Coef	$p < \|z\|$	Coef	$p < \|z\|$	Coef	$p < \|z\|$
Openness	−0.01	0.70	0.17	0.00	−0.03	0.14
Conscientiousness	−0.04	0.07	−0.03	0.14	0.17	0.00
Extraversion	−0.03	0.14	−0.04	0.07	0.07	0.03
Agreeableness	−0.04	0.07	0.07	0.03	0.00	0.98
Neuroticism	0.07	0.03	0.00	0.98	0.01	0.25
Locus of Control	−0.16	0.00	−0.01	0.70	0.17	0.00
N	3409		3409		3409	

GSOEP Youth Questionnaire

Standardised coefficients of the latent personality trait on school placement

$p < |z|$ based on robust standard errors

Table 4.3: Personality traits on school placement, joint SEM with all personality traits included, SEM, MLMV estimation

	Lower vs other		Intermediate vs other		Upper vs other	
	Coef	$p < \|z\|$	Coef	$p < \|z\|$	Coef	$p < \|z\|$
Openness	−0.05	0.04	−0.03	0.11	0.08	0.01
Conscientiousness	0.01	0.45	0.01	0.14	−0.02	0.05
Extraversion	0.01	0.40	0.00	0.95	−0.01	0.52
Agreeableness	0.01	0.57	0.00	0.81	−0.01	0.78
Neuroticism	0.01	0.73	0.01	0.68	−0.01	0.51
Locus of Control	−0.13	0.00	−0.01	0.71	0.14	0.00
N	3409		3409		3409	

GSOEP Youth Questionnaire

Standardised coefficients

$p < |z|$ based on robust standard errors

The structural equation models, that allow each measurement to have different weight on the latent personality trait, results indicate effects of three personality variables on school placement: Conscientiousness, Extraversion and Locus of Control. These models however, do not consider other characteristics within persons. In the next step, all the personality traits are jointly used in one model as shown in figure 4.2 (full table in the appendix, table P). The interpretation differs in terms, now that each personality trait can only be interpreted as dependent, or under control of other characteristics a person owns. The results of these new models (table 4.3) differ slightly from the ones above.

For attending an intermediate secondary school no effect can be found. With higher Locus of Control and Openness to Experience the likelihood of attending a lower secondary school declines. On the other hand, attending upper secondary school is more likely with rising (internal) Locus of Control and Openness to Experience. A negative significant effect of Conscientiousness is found for on attending upper secondary school, which is the opposite of what was found in the single model, and does not support the hypothesis, nor the results of previous research.

For Openness to Experience and Conscientiousness positive effects were expected. In both, lower and intermediate secondary, Openness to Experience leads to better grades.

Table 4.4: Personality traits on maths grades 1–'not sufficient' to 6–'very good', separate models for each personality trait by level of secondary schooling (summarised results), SEM, MLMV estimation

	lower		intermediate		upper	
	Coef	$p < \|z\|$	Coef	$p < \|z\|$	Coef	$p < \|z\|$
Locus of Control	0.24	0.12	0.32	0.05	0.19	0.09
Openness	0.32	0.05	0.19	0.09	−0.06	0.21
Conscientiousness	0.19	0.09	−0.06	0.21	−0.01	0.87
Extraversion	−0.06	0.21	−0.01	0.87	−0.07	0.27
Agreeableness	−0.01	0.87	0.01	0.60	0.02	0.64
Neuroticism	−0.07	0.27	0.02	0.64	0.13	0.00
N	596		1045		1294	

GSOEP Youth Questionnaire
Standardised coefficients
$p < |z|$ based on robust standard errors

It improves the maths grade by 0.32 in lower secondary school, and at the intermediate secondary grades improve by 0.19. A higher intrinsic value on the Locus of Control scale leads to better grades in intermediate and upper secondary schools. Conscientiousness improves grades, but only in lower intermediate secondary school.

Neurotic Children Are Better at Maths – Effects of Personality on School Grades

In terms of grades (table 6.1, full tables in the appendix table Q – table V), there is one significant effect on the 1%-level: Neuroticism effects maths grades positively. This means a higher degree of Neuroticism leads to better performance in maths, however only for children in upper secondary schools. On the 10%-level, several significant effects are found. Within lower secondary schools, Openness to Experience and Conscientiousness positively effect maths grades. In intermediate secondary schools, an internal Locus of Control has a positive effect on maths grades. The same can be observed for Openness to Experience. Next to the dominant effect of Neuroticism, within upper secondary schools, an internal Locus of Control has a positive effect on maths grades.

4.7 Effects of Personality on Income

One of the most discussed questions in the research on personality is the direction of causality in the effects of achievements and personality. The following analysis addresses this issue by mimicking the (possibly) reciprocal effects between personality traits and income over time. The main panel of the SOEP contains two waves of personality measurements and yearly measures of income. This longitudinal structure is used to estimate a cross-lagged auto-regressive structural equation model.

For deriving hypotheses there is, as above mentioned, no general theory for both causal direction or how the reciprocal relationship should look like. A central problem in theory building in this area of research is the generalisation of effects of or on personality traits in specific settings that might or might not affect long term outcomes. This problem will be discussed later on in 7 for all of the chapters. Facing this problem, I would like to refer to the general research question and forego deriving single hypotheses to each of the single personality traits. The research question, transferred to this sub-topic, addressed how and to what extent personality traits affect income and vice versa. Even though at this point of time setting up hypotheses would be rather guessing than a proper derivation, the models contribute to the research gap. Modelling reciprocal effects is rarely done in sociology and there is hardly another approach than cross-legged auto-regressive SEM to do so. As demonstrated in the literature review, most of the research so far concentrated on effects of personality on educational and labour market outcomes. Fewer studies examined labour market outcomes affecting personality, and hardly any study explicitly modelled reciprocal effects between these two.

For Locus of Control there has been a debate on the causal direction. Still most studies examine the effect of Locus of Control on labour market outcomes (for a review, see Cobb-Clark, 2014). The counter argument assumes persons with higher income or other indicators for labour market success, such as leadership positions, personnel responsibilities, or socio-economic status to actually have more control over their lives compared to manual workers and people in the lower service sector with less income and fewer favourable job attributes. It is hypothesised that Locus of Control is not only a perceived

control over peoples' lives but a realistic estimation of individual life situations. This means people in disadvantaged labour market positions actually do have less control over their lives because of lack of opportunities, whereas the highly-qualified and advantaged labour force have a broader range of opportunities to choose from, and therefore more control over their life decisions. In addition, leadership positions provide more freedom in control than lowly ranked positions. Locus of Control is shaped by educational and career choices that are in fact more advantageous for the highly educated and privileged. Gottschalk (2005) summarised this research gap: 'It is not clear, however, whether adults' Locus of Control responds to the economic, social, and demographic events that they experience or whether the reverse is true. The potential simultaneity between Locus of Control and labour market outcomes poses enormous econometric challenges and renders much of the applied literature in this area rather unconvincing' (p. 7).

4.7.1 Methods for Personality and Income

For analysing the effects of personality and income and vice versa, data from the GSOEP main questionnaire is used. The persons are 18 and older. The data spans the years 2004 to 2013. Measurements are taken from the following years: The Big Five were measured in 2005, 2009 and 2013. The sample consists of the workforce between 25 and 65 years and a monthly income higher than 450. The gross monthly income is measured yearly, but to receive a logical time order for the personality measurements and the income change, the years before and after, but not the same year of the measurement of the personality traits were taken. The first measurement is in 2004, then the average income from the years 2006–2008 and the average income from 2010–2011. Locus of Control on the other hand, was measured in 2005 and 2010. This changes the coding of income for the second income measurement to 2006–2009 and the last income measurement to 2011 only. When calculating the averages, single missings were ignored and the average of fewer years was calculated, when all years were missing, no average was calculated.

The model furthermore controls for the highest education in the year 2004, at the beginning of the measurement which has the disadvantage that it does not correct for

those cases that have a rising income due to higher education over the years. However, in the majority of all cases there is no changes in education and the effect size of the change of income from one year to another is a mere control variable in this model to capture the interdependence of income measurements over time, so this does not affect the core interpretation of the estimates of interest. Nevertheless, age in the year 2004 is controlled, which also corrects for the fact that not all of the individuals in the sample have reached their highest education level, yet which is a selective group, namely those in tertiary education. Finally, gender was controlled to take care of the different levels in income between genders.

The model is a cross-lagged auto-regressive structural equation model (Finkel, 1995; Pakpahan et al., 2015), modelling effects in two directions over time. Due to the timely order, it aims to identify causal effects, as far as it is possible to talk of causality in a pseudo-experimental setting. The model starts with the first time point, income in 2004, controlling for age, gender and education at that time. Then it models the effect of a personality trait at the next time point, 2005, and the next income time point, 2006–2008 and so on. While the personality trait is modelled as latent variable, composed of its measurements of the specified year, income is modelled as manifested variables. The personality trait is both endogenous and exogenous in terms of the income: There is a significant effect of the income of the year before and has an effect on the income of the following years. This is repeated for the next measurement points and ends with the last measure in 2013.

4.7.2 Results – A Dynamic Model of Income and Personality Traits

A first bivariate correlation analysis reveals the effects across personality traits and income to be low, but significant (table 4.5). The correlations were calculated on the basis of the grand means of all years and all three items for the Big Five, and nine items for Locus of Control, and the average gross monthly income from 2004 to 2012. A positive correlation of 0.03 is calculated for Openness and Conscientiousness, and 0.20 for Locus of Control. In

Table 4.5: Pairwise correlation of income and personality

Income	$Corr.coef.$	$p > \|t\|$	N
Openness	0.03	0.00	12170
Conscientiousness	0.03	0.00	12171
Extraversion	−0.03	0.00	12170
Agreeableness	−0.08	0.00	12171
Neurotism	−0.16	0.00	12171
Locus of Control	0.20	0.00	8842

GSOEP main questionnaire

contrast, negative correlations were found for Extraversion (-0.03), Agreeableness (-0.08), and Neuroticism (-0.16). While all the other personality traits show the direction as stated in the hypotheses, Extraversion and Agreeableness have a significant negative correlation with income. The initial hypotheses for Extraversion and Agreeableness however stated them to not have significant effects on income at all.

When looking at the SEM (figure 4.3 - figure 4.8, the complete tables can be found in the appendix, table W – table), unsurprisingly, all of the paths around the control variables gender, age and education are statistically significant in all models, as well as the paths between the three measurements of income and the three measured years of personality traits. The paths of main interest, the ones between personality and income, are, however, less clear.

The first model (figure 4.3) presents the results for income and Openness to Experience. The only significant effect between these two variables, is the effect of the average income of 2010–2012 on Openness in 2013. This effect is negative, which implies declining Openness to Experience with rising income.

In contrast, figure 4.4 shows a trend towards Conscientiousness having a negative effect on income, while income has a negative effect on Conscientiousness in the first measurement, which is the path of income in 2004 to Conscientiousness in 2005. In essence, these results suggest more Conscientiousness leading to less income. This does not support the hypothesis and is very counter-intuitive. Taking the items literally, it would mean that people who claim to do a thorough job, not to be lazy, and to work efficiently, earn less.

The model analysing Extraversion and income (figure 4.5) shows a general trend of income leading to introvert personality with $\beta = -0.08$ in the first and $\beta = -0.05$ second path from income to Extraversion. The third path from income of 2010–2012 to Extraversion in 2013 also has a negative coefficient, but does not reach the significance threshold. In contrast, Extraversion shows no effect on income at all.

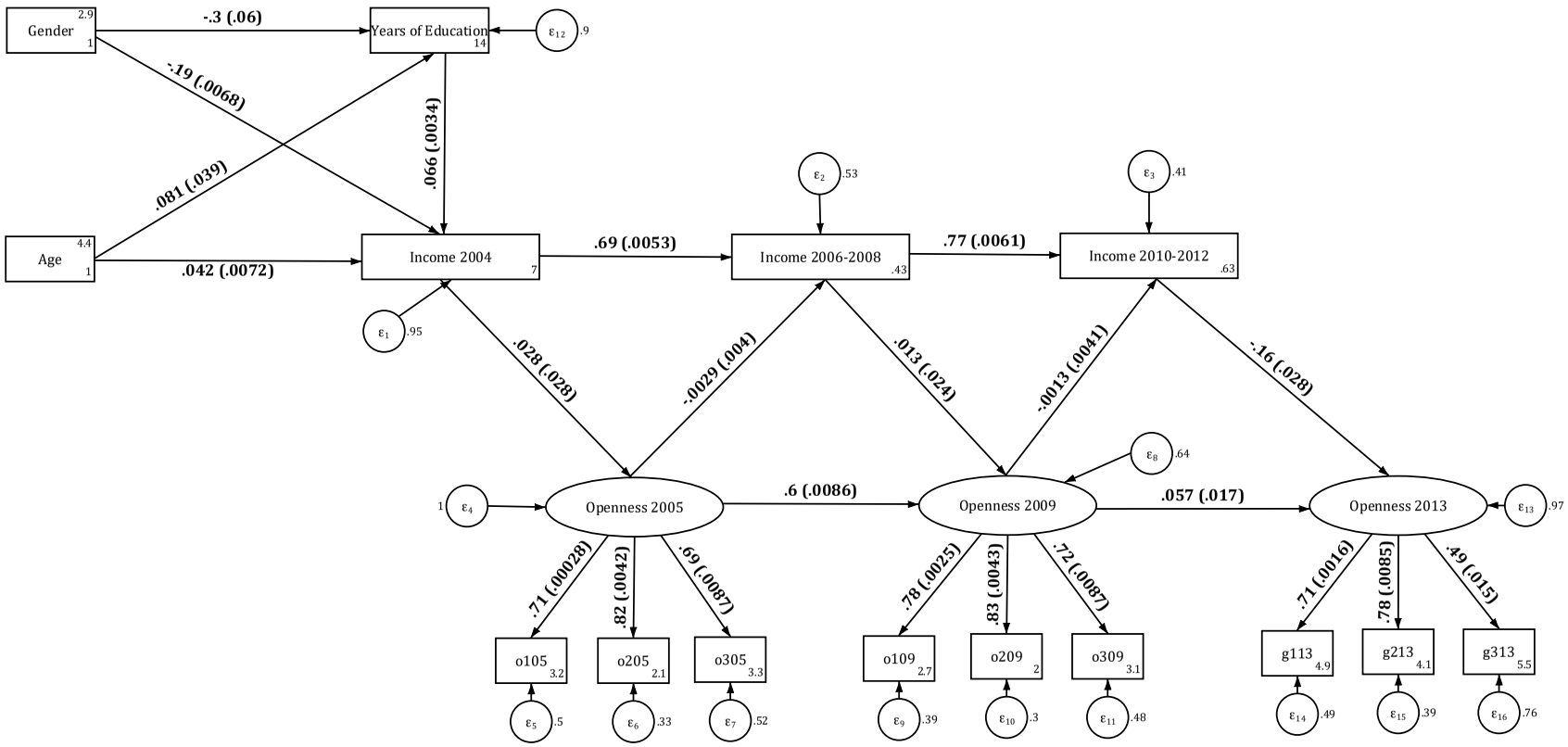
Figure 4.6 shows the results for Agreeableness and income. The trend for this model is very clear: Higher income leads to less Agreeableness and more Agreeableness leads to lower income. The effects for income on Agreeableness are higher than for Agreeableness on income.

Similar results can be observed in figure 4.7 presenting the results of Neuroticism and income. The higher the income, the smaller the degree of Neuroticism, and the higher the degree of Neuroticism, the lower the income. However, the effect of income on Neuroticism is not significant in the last path from the income of 2010–2012 and the Neuroticism measurement of 2013.

Figure 4.8 displays the estimates for Locus of Control and income. Income has a positive effect on (an internal) Locus of Control, while higher values for Locus of Control lead to more income. In contrast to the personality items of the Big Five, Locus of Control is shows low stability over measurements. Also the fourth item of the scale (success is a result of hard work), shows lower factor loadings compared to the other items in both measured years, indicating that this item has not an optimal fit in the Locus of Control construct. However, the significance of the factor suggests it should remain in the model.

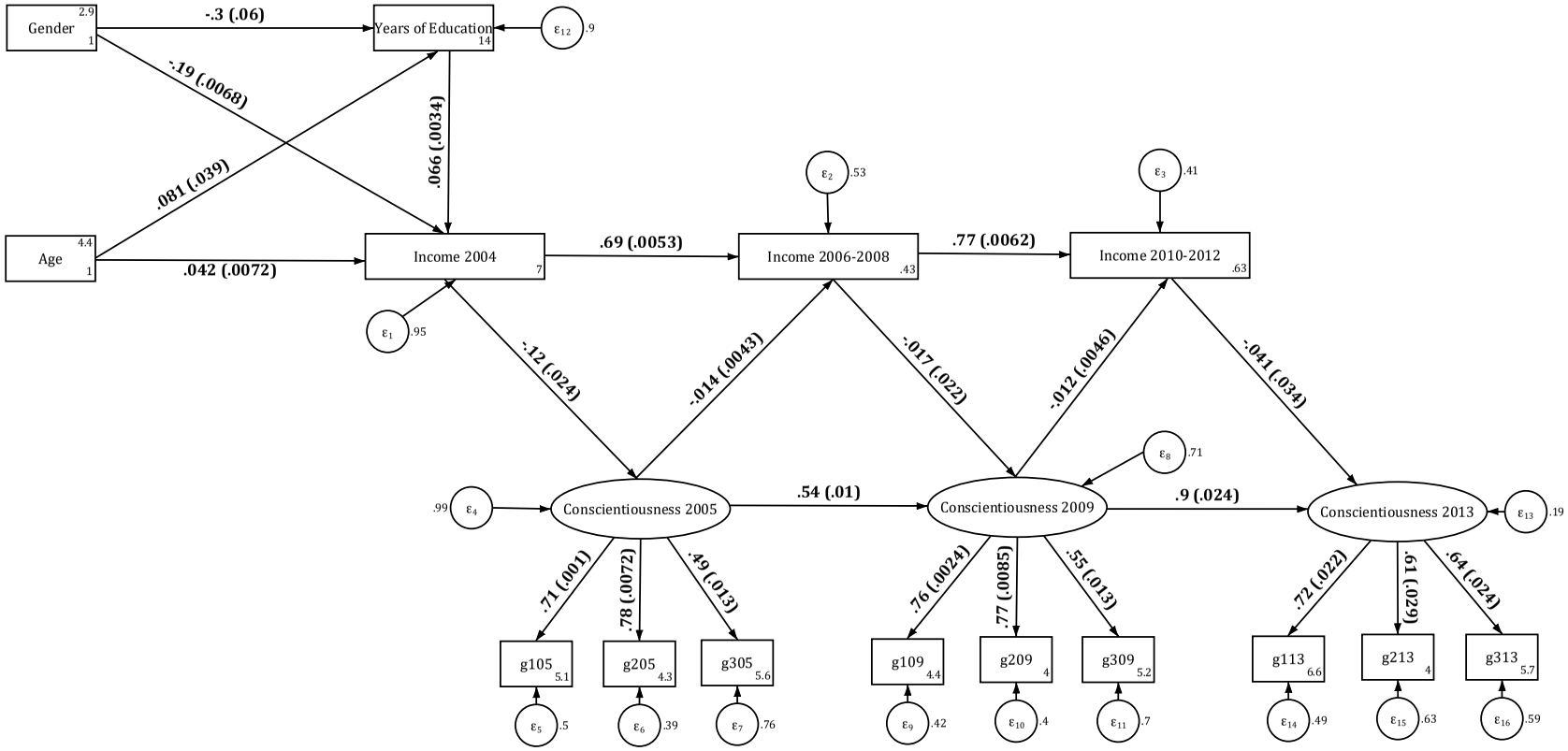
In all of the models personality shows a similar changes over time as income. Regarding the idea of stability of personality, as it is often presumed in models, these results are indicating personality changing over time, just as much as income is. This result objects the statements of Costa et al. (2000).

Figure 4.3: Cross-Lagged Auto-Regressive SEM (MLMV) for Openness and income



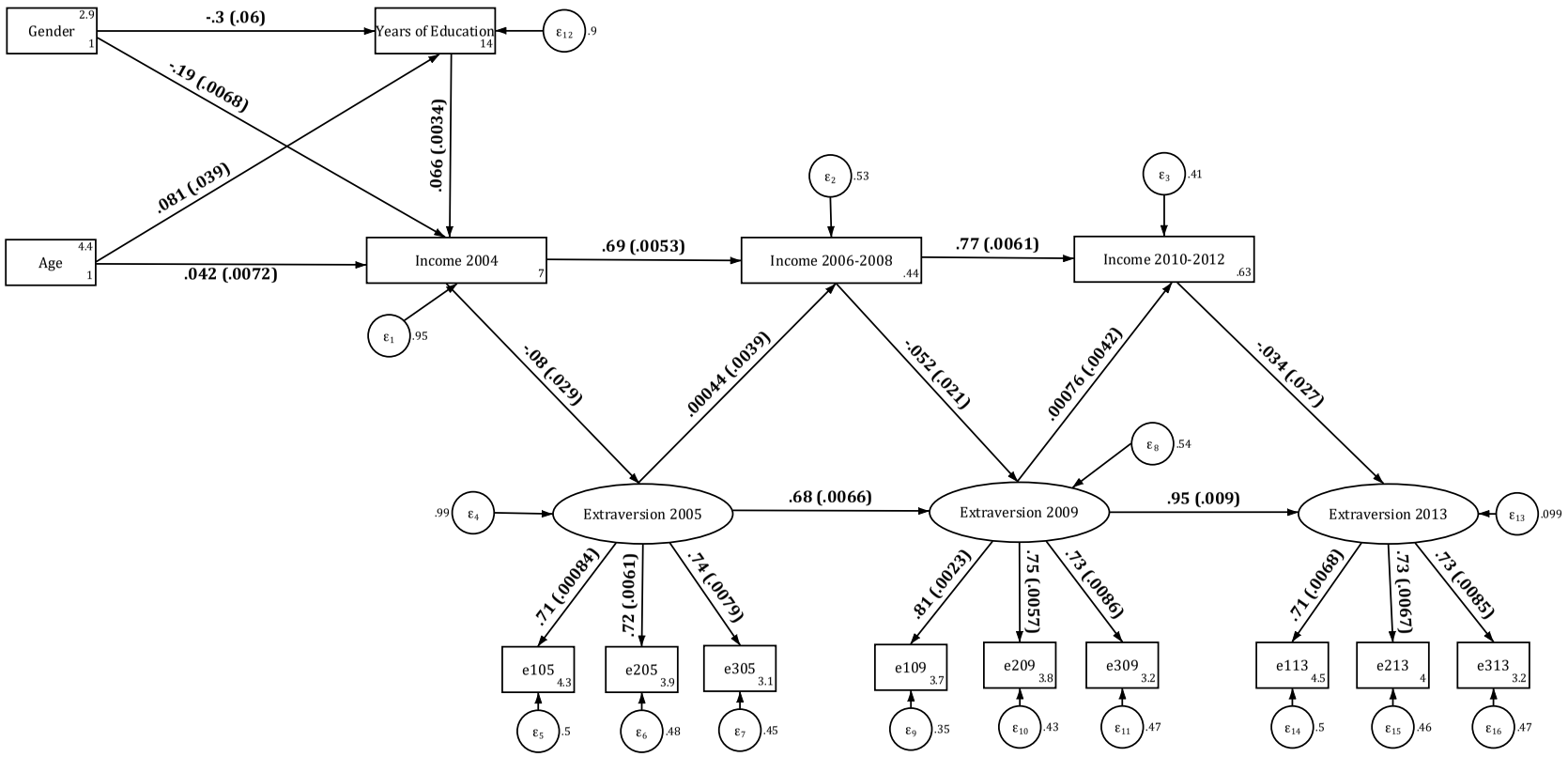
Standardised coefficients with robust standard errors in brackets in bold print
Standardised intersect at the right bottom of the boxes; for gender and age on the right top, standardised variance of error terms on the right next to the error term
GSOEP main questionnaire

Figure 4.4: Cross-Lagged Auto-Regressive SEM (MLMV) for Conscientiousness and income



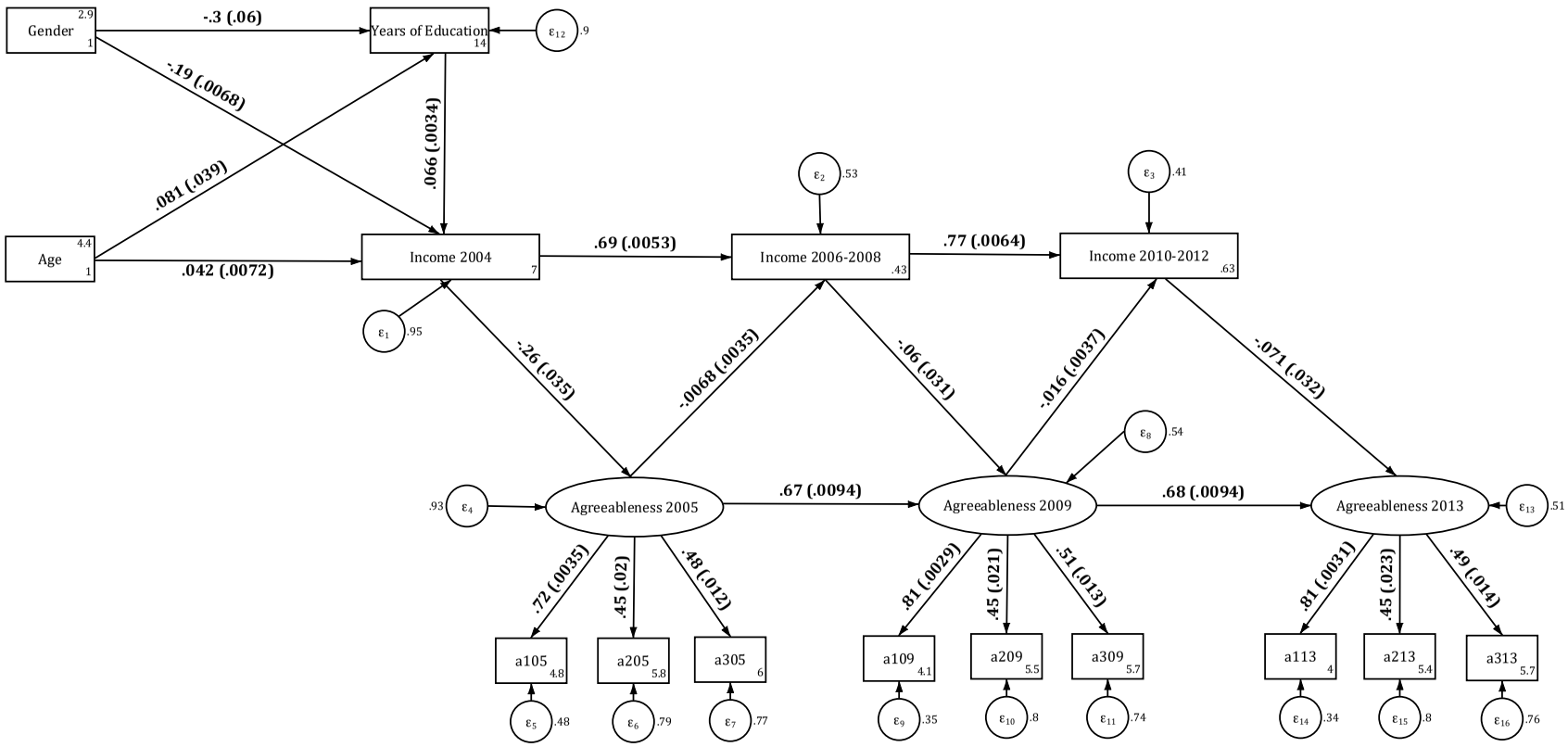
Standardised coefficients with robust standard errors in brackets in bold print
Standardised intersect at the right bottom of the boxes; for gender and age on the right top, standardised variance of error terms on the right next to the error term circle
GSOEP main questionnaire

Figure 4.5: Cross-Lagged Auto-Regressive SEM (MLMV) for Extraversion and income



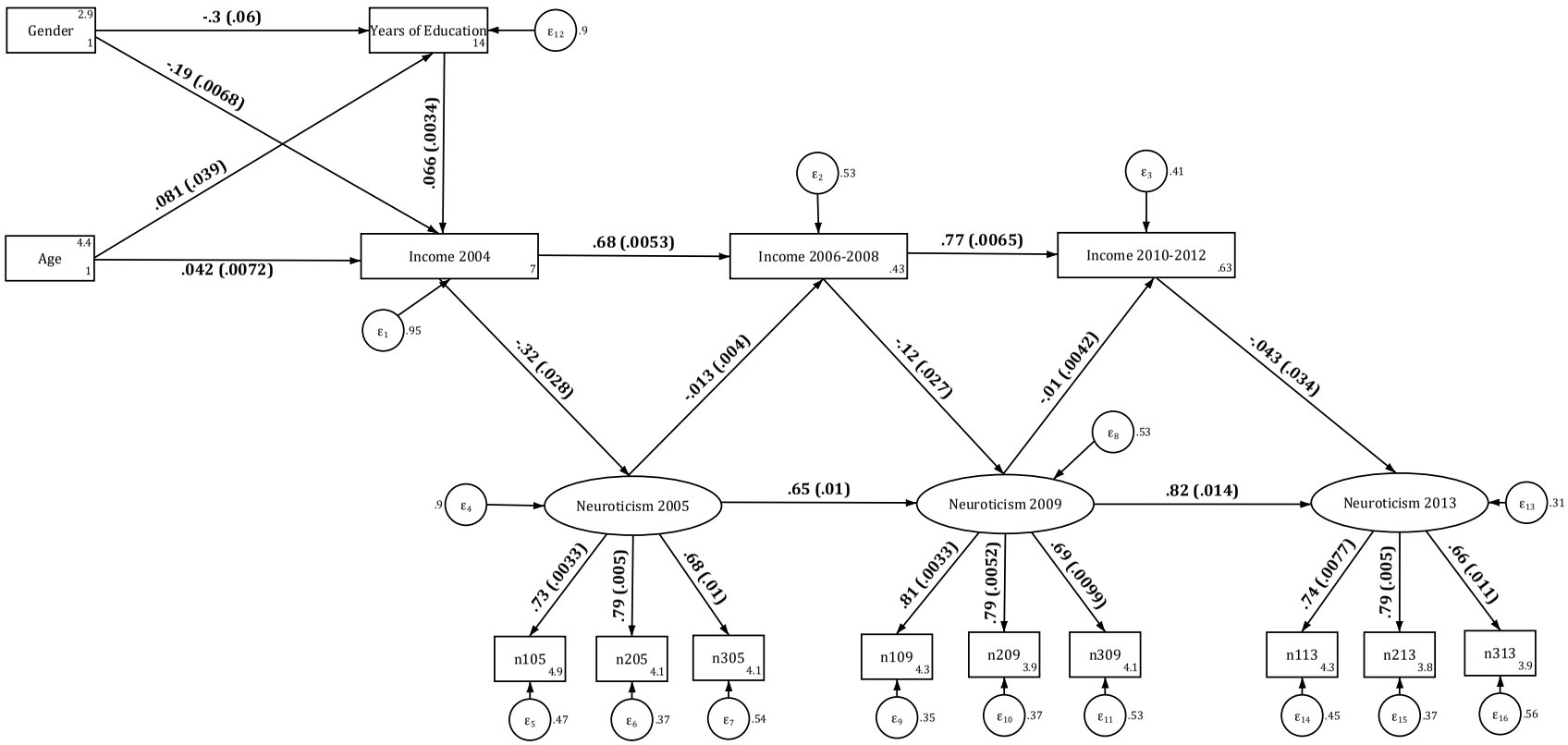
Standardised coefficients with robust standard errors in brackets in bold print
Standardised intersect at the right bottom of the boxes; for gender and age on the right top, standardised variance of error terms on the right next to the error term circle
GSOEP main questionnaire

Figure 4.6: Cross-Lagged Auto-Regressive SEM (MLMV) for Agreeableness and income



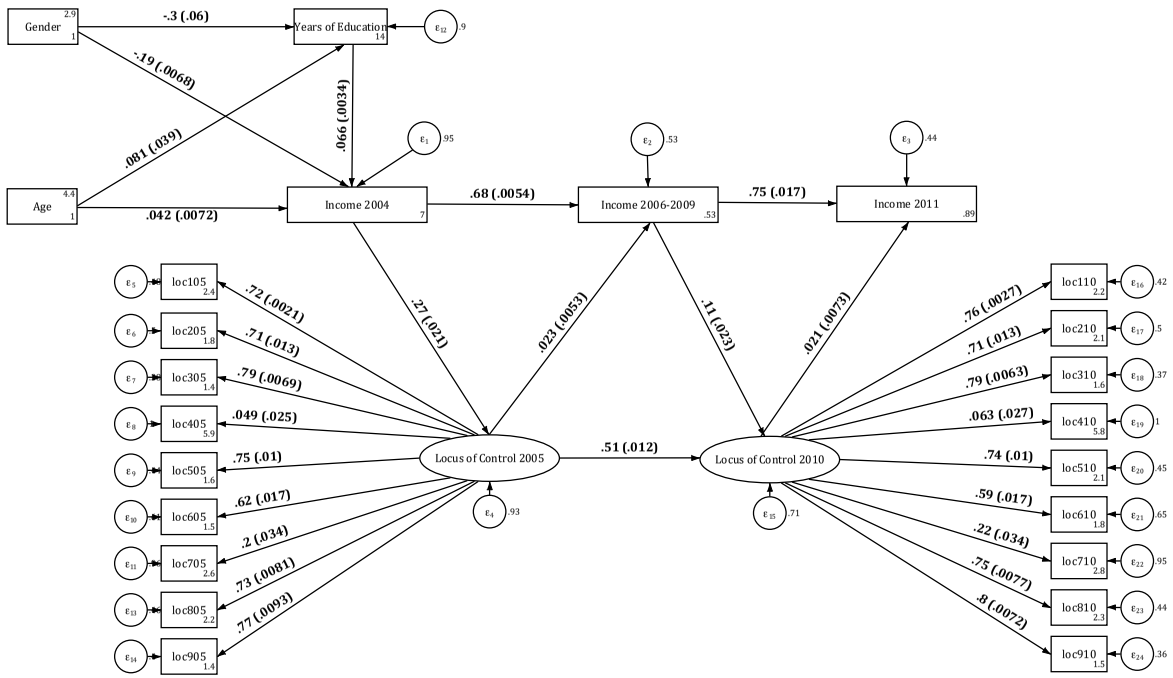
Standardised coefficients with robust standard errors in brackets in bold print
Standardised intersect at the right bottom of the boxes; for gender and age on the right top, standardised variance of error terms on the right next to the error term circle
GSOEP main questionnaire

Figure 4.7: Cross-Lagged Auto-Regressive SEM (MLMV) for Neuroticism and income



Standardised coefficients with robust standard errors in brackets in bold print
Standardised intersect at the right bottom of the boxes; for gender and age on the right top, standardised variance of error terms on the right next to the error term circle
GSOEP main questionnaire

Figure 4.8: Cross-Lagged Auto-Regressive SEM (MLMV) for Locus of Control and income



Standardised coefficients with standard errors in brackets in bold print
Standardised intersect at the right bottom of the boxes; for gender and age on the right top, standardised variance of error terms on the right next to the error term circle
GSOEP main questionnaire

4.8 Summary – The Usual Suspects and Some Surprising Results

This analysis has researched to what extent personality affects education and the reciprocal effects between personality and income. Positive effects on school attainment were associated with Openness to Experience (A1), Conscientiousness (A2), and Locus of Control (A6). No effects were expected for Agreeableness (A4) and Extraversion (A3), and Neuroticism was expected to have a negative effect on educational attainments (A5).

In terms of attending a certain school type, Locus of Control, Conscientiousness and Extraversion showed a trend towards attending better schools with rising values, i.e. internal Locus of Control, high Conscientiousness and a higher degree of Extraversion rather than Introversion. The first two effects supported the expectations of (A3) and (A6), while the consistent effect of Extraversion was surprising and did not follow the expectation (A3). Neuroticism was found to have a positive effect on attending a lower secondary school, which also supports (A5).

Openness to Experience (A1) had a positive effect towards attending an intermediate secondary school, but no significant effect on attending one of the other school types. Agreeableness makes a difference when attending a lower or an intermediate secondary school but not for attending an upper secondary school. When controlling for other personality traits, effects for the middle category, intermediate secondary schools, diminish and only effects on the lower and upper end prevail.

When looking at grades, personality has a relatively low effect. While Locus of Control seems to matter more in intermediate schools than in upper secondary, it has no effect at all in lower secondary school. Openness to Experience in turn, has an effect on grades in lower and intermediate secondary but not in upper secondary school, and Conscientiousness only has an effect in lower secondary school.

What conclusions can be drawn from these results? The results were not consistent over different groups (school types) indicating stronger and weaker effects over the attainment distribution. This also shows the inappropriateness of linear models in this

context. Agreeableness, for example, seems to matter only when educational attainment is not very high. Agreeableness tends to represent the social aspect of personality among the Big Five: being rude to others (inverted item), having a forgiving nature, and being considerate and kind towards others. It seems as if children with high cognitive resources can compensate their lack of social skills better than children with lower educational outcomes. This also seems to be the case for Neuroticism, the degree of emotional stability, which leads to a higher probability of attending a lower secondary school, while it pushes up good grades in upper secondary schools. Furthermore, the results suggest, that favourable personality traits influence school placement, while they play a minor role in educational performance within school types. This is due to differences in the distribution of personality traits, that leads to a greater homogeneity in personality traits within school types. When including all personality variables in one model (table 4.3), many of the effects, that could be seen when isolating the traits, vanish.

An open question remains in this analysis, i.e., whether personality is shaped by educational success or whether or not personality leads to educational success. A strong external oriented Locus of Control, for example, can represent the actual helplessness of a child with past experience of working hard but still failing at school. This might be due to lack of intelligence, but more than that, a wrong approach in learning style or learning behaviour or lack of support as when it is needed. When confronted with failure, the child might lose trust in their ability to achieve goals through learning and the lack of effort results in lower educational attainment. This can be generalised to other personality traits: Children react in a certain way regarding their personality predisposition, e.g. in a conflict situation with friendly and forgiving behaviour, and adapt their behaviour in the next similar situation according to the outcome in the previous situation. This mechanism leads to type of circular causation – a self-reinforcing process.

For education outcomes of adults, of course, it is pointless to examine, because education is in most cases a time-invariant variable. This question would be interesting, if there was information on personality and school outcomes in younger ages. I choose to examine income and personality due to the higher variability of income in contrast to educational

outcomes. Especially when looking at school placement, a change of school types are rather rare, downward movements even more than upward movements. Furthermore, this type of analysis demanded longitudinal data in both personality and educational or career outcome variables. The analysis showed that income has a significant effect on several personality traits and vice versa. Some striking effects were found in different variables besides the 'usual suspects', namely Openness to Experience, Conscientiousness, and Locus of Control. As in the analysis of school outcomes, the results were not always consistent.

The models for Openness to Experience and Conscientiousness showed some puzzling results. There was only one significant path from income to Openness in the last observed year. Two paths from Conscientiousness to income and one path from income to Conscientiousness were significant, and all of them opposite the direction that was predicted before (results indicate negative effects). This result also opposes the bivariate correlation analysis. In the model of Conscientiousness, the estimates of the not-significant paths were also negative, which is consistent in terms of logic or trends of effects. However, taking the inference or rather significance into consideration, the effects are practically zero.

To explain these results, I would like to draw attention to these two variables being the most cognitive personality traits. It might be that there is a tendency of individuals comparing themselves with their peers and colleagues rather than the rest of the population. This would mean the bias in answers is toward an indifference over the social strata and greater differences within peers.

Differing effects over measurement waves are usually attributed to differences in the years of measurement, however, there is no obvious explanation for why personality effects would differ over this (in historical terms) short time period. One possibility could be the bank crisis of 2007/08, however, then a change in results would be expected in the after the second measurement of income in 2006 to 2008, which is not the case in either models.

The model for Extraversion shows a trend towards income leading to an introvert

personality. In other words, income tends to make people less talkative, less sociable and outgoing, and more reserved. This effect, however, is not visible in the last observed years. This might be connected to longer working hours and less free time activities, which the model does not control for. If this is the case, the greater amount of stress would be a convincing explanation. Similar to Extraversion, Agreeableness also represents a social dimension of personality. The results clearly indicate a negative self-reinforcing cycle on rising income. The theory of stress as an explanatory factor can also be applied to Agreeableness.

However, rather than trying to find explanatory third variables, a direct effect of income – and connected with it – social status, should be considered: rising property acting as a personality changing entity. This adaption seems useful regarding the negative effect of Agreeableness on income, which means that a change towards less Agreeableness is rewarded with more income. Even though the model made reciprocal effects visible asking for mechanisms is, colloquially speaking, a bit like asking whether the chicken or the egg came first.

The results for Neuroticism point clearly towards existing theory and literature. Lack in emotional stability leads to less income and less income leads to less emotional stability. High degrees of Neuroticism lead to lower performance at work, which has an effect on income. Self-selection into high income jobs is a possible explanation for this effect. Emotionally unstable individuals prefer to work less or in less stressful jobs, and avoid jobs that require a high amount of responsibility, which, in turn, are usually paid better. On the other hand, low income causes higher amounts of stress, e.g. in the form of existential worries and anxiety. This particular aspect is most likely to be the one closest to inequality of health research.

The last model analyses the effects of income with Locus of Control and vice versa. The estimates behave as the theory predicted: positive effects of (internal) Locus on Control on income and vice versa. One of the unanswered questions in this area of research was the issue of causal direction of effects. The model suggests a reciprocal relationship with income having a stronger effect on shaping the Locus of Control than vice versa.

The analysis of income and personality with cross-legged auto-regressive SEM yielded several surprising results. In most cases, the relationship was reciprocal, even if not always consistent (e.g. in the case of Conscientiousness). Second, in most models income showed to have a stronger effect on personality than personality on income. Personality showed a remarkable amount of variability over the years, which lets me conclude that personality is malleable to internal and external factors rather than being stable, even in adulthood. Future studies could build on these results by examining whether life events contribute to the reciprocal effects. Possible life events could be unemployment, marriage or promotions. Generally, the model could be translated into a life course dependent time line rather than absolute years.

This analysis has shown that there are some personality traits that are relevant for educational outcomes as well as income, however not to the same degree. The next chapter discusses to what extent these relevant personality traits differ by social background and what are the underlying mechanisms in the transmission of educational attainment as well as personality from the parents to the children.

5 Personality as an Explanatory Factor in the Reproduction of Educational Inequality

In this chapter, I will address the question of the role of personality of both parents and children in the transfer of educational attainment. The analysis intends to introduce personality in its function as a potential influential factor on the reproduction of educational inequality following the concept of primary and secondary effects (Bourdieu and Passeron, 1977). First, a general overview on the most important theories on inequality of educational opportunities is presented. Second, how personality should act as an explanatory factor in the relationship between parental education and children's educational outcomes, will be discussed. Personality is assumed to be part of the secondary effect, which is associated with class specific preferences. This idea is then linked to Rotter's (1990) concept of personality as a primary action guiding preference and tested.

5.1 Introduction Into Research on Inequality of Educational Opportunities

The reproduction of social inequality has been one of the most important subjects of past and present of sociology. A seminal work is 'A Constant Flux' by Erikson and Goldthorpe (1992). The book examines class mobility in Western and Eastern European countries, and additionally the US and Japan. Due to the lack of panel data, the authors

chose pooled cross-sectional data and coded them into a comparative data set. With this approach, they examined social mobility as an inter-generational process, rather than a life-course process. A major contribution of the book is the theoretical and empirical differentiation of absolute and relative mobility, where relative mobility considers the changing competition of cohorts. The authors propose that it is the relative mobility that defines the permeability and openness of a society, labelled 'social fluidity'. Their main finding showed highly differing levels of mobility within and between countries in terms of absolute mobility, but very low relative mobility. In 'Persistent Inequalities: Changing Educational Attainment in Thirteen Countries', another classical study that has received major attention in the last decades, Shavit and Blossfeld (1993), argued that there is still persistent educational inequality regarding socio-economic status. The book contains 13 country studies of cohorts born between 1910 and 1960. In 11 of the 13 countries under study the authors found an unchanging effect of social origin over transitions and cohorts. The authors used a partially standardised research design, in which there were measures standardised across countries, but still space for countries to tackle their country specific questions and data. As the main method they chose the 'Mare Model' (Mare, 1980, 1981), using the log odds of a binary logistic regression model and successive educational transitions.

Based on this study, Breen et al. (2009) argued that these findings are a result from methodological issues and a relative positioning of socio-economic status. Instead of using the Mare model, they applied an ordered logit estimation and found declining trends for educational inequality in Germany, France, Italy, Ireland, Sweden and the Netherlands. They faced similar data problems as Shavit and Blossfeld (1993), e.g. the German dataset was nearly half the original sample size after taking the relevant variables into consideration, however, they still managed to analyse larger data sets then the ones used in the original study. So one main argument of the authors against the findings of Shavit and Blossfeld (1993) was the small sample sizes and therefore the underestimation of effect sizes. Another study stemming from the same project showed similar effects for Germany (Pollak and Reimer, 2005). There is still an ongoing discussion, but regardless

of this, what these studies share is that the main driver of reproduction of inequality is education (Blossfeld, 1993). In modern meritocratic societies it is widely believed that the societal order can be changed through individual attainments in education. Following the vast research on the transmission of educational achievement, there is, however, still a strong correlation between parental and children's achievements.

Hattie (1992) conducted a meta-analysis of 136 meta-analyses including possible factors of explaining student's educational attainment and finds that most of the variance explained was ascribed to students' entities. Only about 5–10% go back to parental factors. Even considering the quality of schools and teachers as well as peer-related factors, where the students' individual influences come from is not explained. In fact, they might be given from the parents to the children by unmeasured variables and therefore empirically remain in the students' effect rather than in the part explained by parental characteristics. In contrast, Jencks et al. (1972) provide a vast overview of possible factors of the effect of family background on schooling, however, while they mention noncognitive traits as a potential factor, it is only briefly noted. However, noncognitive traits and personality, as a special case of noncognitive trait, can be integrated into existing theories of theories of inequality in educational opportunity.

5.2 Primary and Secondary Effects in the Reproduction of Educational Inequality

Next to the work of Becker (1964), who proclaimed a rather strict individualistic of decision making, most of the modern rational choice based theories in educational sciences have their roots in the work of Boudon (1974). Boudon saw inequality in educational outcomes as a result of rational decisions made primarily by the parents. The educational investment made in a child is the result of a reasoning of the costs of education and the expected gains in returns to education. In more abstract terms, decisional processes are seen as the maximisation of the social production function of invested costs and returns. In the decisional process, Boudon describes primary and secondary effects. Primary

effects are the influence of the position in society, that is bound to a certain level of cultural, social and material resources. The higher the position, the more these resources are available. The primary effects define the starting position of a person, where the distance to achieving, for example, a university degree, differs according to the social position.

When talking about resources, often the expression of 'social, cultural and material capital' is used, terms that have been imprinted by Bourdieu (1986), who, in contrast to the individualistic rational choice approach, advocated a structural view on inequality. These types of capital are unequally distributed, depending on the social position, and when handed down to their children, determine their position, too (Bourdieu and Passeron, 1977). A special characteristic of such capitals is that they are exchangeable and can be transferred into another form of capital. Even though Bourdieu's view and the rational choice approach were seen as two opposing paradigms, they do complement each other in a more moderate interpretation of those structural and individualistic approaches (Barone, 2006; Reddig and Tranow, 2014). The concept of capitals fits neatly into the concept of Boudon's primary effects. The three different forms of capital can each directly or indirectly invested into children's education. Children themselves are equipped with those resources when going through the education system. Primary effects are direct results of the available resources due to social position that affect children's demonstrated school performance They might be of genetic or socio-cultural kind (Jackson et al., 2007, p. 212).

Economic capital includes material goods such as money, as well as goods such as books, instruments, paintings, cars and houses. There is an agreement among researchers and extensive empirical evidence that material means promote educational success. Social capital implies having useful connections to other people with high capitals. In educational studies this could for example mean knowing the principal of a school or your son's professor, or having relevant networks (colloquially referred to as 'Vitamin C'), but also knowledge of appropriate upper-class behaviour and etiquette. The theory of social capital has been proven empirically to be very relevant for inequality research, especially

in network analysis, e.g. in successfully finding a job (Granovetter, 1973). Cultural capital is the knowledge about the highbrow culture. For example, an expensive painting is worthless without the knowledge of the art. A violin is useless if one does not know how to play it. It also includes behavioural knowledge that is useful for success at school and in one's career. This might, for example, include an appropriate use of language.

Bourdieu's theory of transferable capital has been criticised in particular by US educational researchers (Lareau and Weininger, 2003), because, while Bourdieu's theory does apply for the difference between the upper class and the rest of the population, whereas the biggest differences in education nowadays are between the lowest class versus the middle and upper classes. One might argue that the explanatory power of this theory has lost impact in countries where educational expansion has reached most of the population. However Lareau and Weininger (2003) also point out that there are 'new' kinds of cultural capital, next to highbrow culture, that still define and explain differences between social classes.

Secondary effects refer to the class specific ideas, ideals and the judgement of chances in the decisional process. Those differ by social position and can still be influential, even if the effect of primary effect is diminished. This implies that even if the primary effects were eliminated, there would still be differences in the choice of educational pathways by classes. Erikson et al. (2005) build on this idea, showing in a counterfactual analysis the transition probabilities of entering higher education by the actual academic performance and class background (figure 5.1). Even if assuming the same academic performance, the real transition probabilities for the working class are below their possible probabilities of transition, while for the higher classes it is the other way around. Here, even underachieving children from higher classes undergo a transition. In the follow-up of this work, Jackson et al. (2007) suggest for policies, to reduce primary effects by reducing the costs of education for the lower classes, rather than changing their socialised ideas (secondary effects). In their study, the primary effects are considerably higher than the secondary effect so that the absolute difference could be strongly reduced by reducing primary effects. Reducing primary effects, for example pre-school education, will reduce

Figure 5.1: The counterfactual model of transition

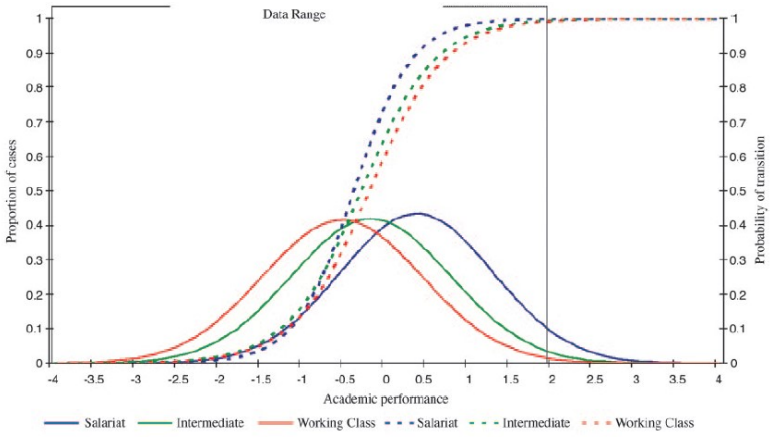


Fig. 1. Fitted normal distributions for performance within each of three classes. Fitted logistic curves for probability of transition as a function of performance.

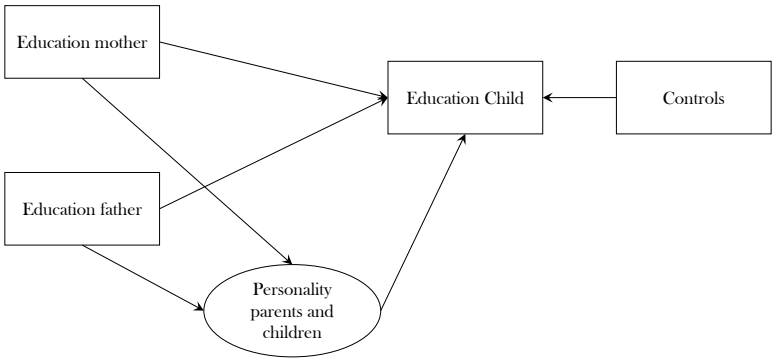
Source: Erikson et al. 2005, p. 9732

the distance to academic goals. This thesis will investigate, whether personality acts as an explanatory factor in the process of reproduction of social stratification.

Personality in the process of reproduction of inequality has a role of an action guiding preference (Rotter, 1990). Personality (the case he discusses is on internal and external control attribution) has especially distinguishing effects on acting when persons face unknown situations. Different manifestations in personality will lead persons to different preferences on how to react to a situation (p. 490). The effects of personality are assumed to be greatest when facing unknown situation, because in situations that have been experienced already, a learning effect might have taken place and facing a situation similar or the same to a previous situation might trigger a reaction resulting from learning what was the best solution in the previous situation, rather than personal preferences caused by personality (ibd.).

In this study, it is critical to test personality as a type of secondary effect, as the measurements do not enable to test the effect of personality on transition probabilities, where transition probabilities refer, in this context, to differences in decisions. In terms of primary effects, the previous chapters have shown some direct effects of some personality traits on educational outcomes. This plays an important role as a sufficient assumption in the following analysis. Assuming differences of personality traits among classes and

Figure 5.2: Illustration of the mediating effect on the effect of parents' education and children's educational outcomes



direct effects of some personality traits on education outcomes, personality should have a mediating effect (explanatory) between parental background and educational outcomes of the children. The mediation effect is shown in the path diagram in figure 5.2.

H1: Personality has a mediating effect on the effect parental background on school placement.

H2: Personality has a mediating effect on the effect parental background on grades.

Many previous studies have used only the father's education or occupation while the mother's educational background has been neglected. Arguments for this strategy are that in the past it was mainly the status of the man that determined the social position of the family. Taking socialisation as an argument, however, the mother as the primary caretaker is expected to have influence on the child, too. Also in terms of secondary effects, both partners are expected to influence in educational decisions (e.g. through power of bargaining in a relationship). Education of the mother cannot be ignored, especially in the analysis using the Youth Questionnaire, which is very contemporary containing a sample from 2000 onwards.

In recent years, growing attention has been paid to the mothers' education, due to the assumption of the influence of the mother in socialisation and education of the children outside school. Previous research (e.g. Blossfeld and Timms, 2003) showed the growing homogeneity amongst couples and its meaning for the reproduction of inequality, and through this a rise of influence of mothers on social status. In older cohorts, the traditional male breadwinner model was the most widespread family model in Germany, while women's participation in the labour market has been steadily rising in the last 40 years (Cipollone et al., 2014). Compared to other European countries, German mothers tend to take a longer break from work after childbirth. Going back into part time work is a common way for women to balance out work-life and family duties, which means women remaining the main caretakers of the children, despite increasing work participation, although to a lesser degree than two decades ago (Keck and Saraceno, 2013).

The central research question is whether personality explains parts of the effect of parental education on children's education. In terms of secondary effects, personality is supposed to influence the tendencies of decision making in sending a child to a certain type of school. Personality is modelled as a mediator, explaining parts of the effect of parental education on children's education. There are two possible mediation outcomes: First, an explanatory effect of personality, decreasing the total effect by explaining parts of its variation; or second, a suppressive effect increasing the total effect, which would be interpreted as the effect of the education of the parents on children's education being stronger when taking into account personality differences. There is no particular assumption regarding to theory why and to what extent children's personality and parents' personality could differ in this effect. In more technical terms, the question is whether personality acts as a mediator. This approach follows a study by Blanden et al. (2007) using American data[1].

[1]In this study the mathematical background of the mediation technique described in detail.

5.3 Method

The first analysis examines the mediating power of personality in the relationship of parental and children's education. This means, measuring the amount of explained variance in the effect of an independent variable (parental education) on a dependent variable (children's education) by a mediating variable (personality). The youth questionnaire is used to observe the effects for teenagers and the effect of parental education at age 17 for academic positioning.

A multinomial logit model is applied. Compared to the alternative, an ordinal logit model, the multinomial model does not assume the differences between the three school types to be equal, which is more realistic. Average marginal effects (AME) are presented. Compared to logit coefficients and the (of those derived) odds-ratios, AME reflect linear distances in a non-linear model. Similar to OLS estimates they are straightforward to interpret and effect sizes are comparable across models based on the same sample. As a downside, AME are dependent on the distributions, i.e. the marginal distribution of variables in the sample. They usually differ across samples which makes a comparison across models with different samples, e.g. countries, impossible.

A similar problem occurs when trying to compare coefficients between models. While in linear models a decomposition of effects can be done without problems because of the linearity of estimates and standard errors, a Generalised Linear Models' estimation can't be compared across different models due to the different basis on which approximation is built. For this reason I use the Karlson-Holm-Breen (KHB) decomposition, developed by Karlson et al. (2012) (also see Breen et al., 2013) to assess the amount of the effect between parental and children's education that is explained by personality. The analysis will look at both, parent's and children's personality traits. The second analysis, effects on grades, is estimated with an OLS regression. Additionally, the analysis of grades is split by school type, since grades are not directly comparable across all school types because of the different demands in subjects depending on school tracks. Mediating effects of personality were again tested with the KHB-estimator.

As control variables, children's gender and year of birth are used to capture systematic

variations between boys and girls as well as cohort effects. To capture effects relating to financial resources (referring to primary effects) or class specific effects, household net income and EGP of both mother and father are taken into account. Because there is a well-researched gap between students with a migration background, especially from Turkey, and students with a German background, a dummy variable for the country of origin of the father was added (1–'German' 0–'other countries'). [2] Personality in this model are the traits of the participants of the main questionnaire, not the ones of their parents. Those are not available.

Missing values are excluded listwise. The highest amount of missing values occurred in the information of parental background, especially household income and EGP. Both are generated variables added by the conductors of the SOEP and missing values in these generated variables is usually a result of missing information on individual income. The second highest amount of missing values was found in the information about the education of the parents. When using multiple regression imputation, the above-mentioned variables are the best predictors for each other. With a relatively high number of missings within these variable, there was, however, not enough information to conduct a reasonable imputation. 180 cases could have been restored, however, the imputation process had several technical problems due to major gaps in the data.

The two-generational data structure, allows to control for personality traits of both the parents and the children, which is an opportunity to test for possible effects of parental and children's personality on the effect of parental education and the educational outcomes of the children. For testing for secondary effects, however, it would have been better to have information on the time of the transition from elementary to secondary school, which is in Germany after fourth grade. This would have made the state of personality in the referring year as well as the actual decision process visible. This might hopefully possible with future panel data.

[2] Mothers' country of origin was difficult to implement because there were many countries but only few cases. Nevertheless, it has been checked in a robustness test and did not yield any effect nor changing effects of other variables in the model. To keep the model as parsimonious as possible, the variable was not included.

Table 5.1: Children's school placement by highest type of school of the father

Child's type of school	Highest type of school father: Lower secondary	Intermediate secondary	Higher secondary	Total
Lower secondary	327	168	40	524
	33.85	12.54	6.01	18.77
Intermediate secondary	431	571	115	990
	44.62	42.61	17.27	35.47
Higher secondary	208	601	511	1,277
	21.53	44.85	76.73	45.75
Total	966	1,340	666	2,791
	100.00	100.00	100.00	100.00

matched main and Youth Questionnaire Number of cases, column percentage below

5.4 Results

5.4.1 Nothing Brings Down the Education Effect – The Influence of Parental Education on School Placement and Personality as a Mediator

Table 5.1 shows how many children are placed in the three different school types dependent on the highest school type attended by their fathers. In case of a total immobility between generations, all of the cases were distributed along the diagonal. For fathers with lower and intermediate school attendance, children tend to do better in most cases. The biggest group of children in lower secondary schools have fathers with lower secondary education. Most children with fathers from lower secondary schools do, however, manage to attend intermediate secondary education. This effect might be due to the most permeable point in the German school system: Many lower secondary institutions provide an option to continue secondary education up to the intermediate level, so called 'Werkrealschulen' and 'Gesamtschulen', which are specifically designed for students coming from lower secondary school. The degree obtained is equivalent to a standard degree of the intermediate track, the 'Realschule'.

Table 5.2: Children's school placement by highest type of school of the mother

Child's type of school	Highest type of school mother: Lower secondary	Intermediate secondary	Higher secondary	*Total*
Lower secondary	327	133	34	494
	33.85	13.56	4.43	18.20
Intermediate secondary	431	416	134	981
	44.62	42.41	17.45	36.13
Higher secondary	208	432	600	1,240
	21.53	44.04	78.12	45.67
Total	966	981	768	2,715
	100.00	100.00	100.00	100.00

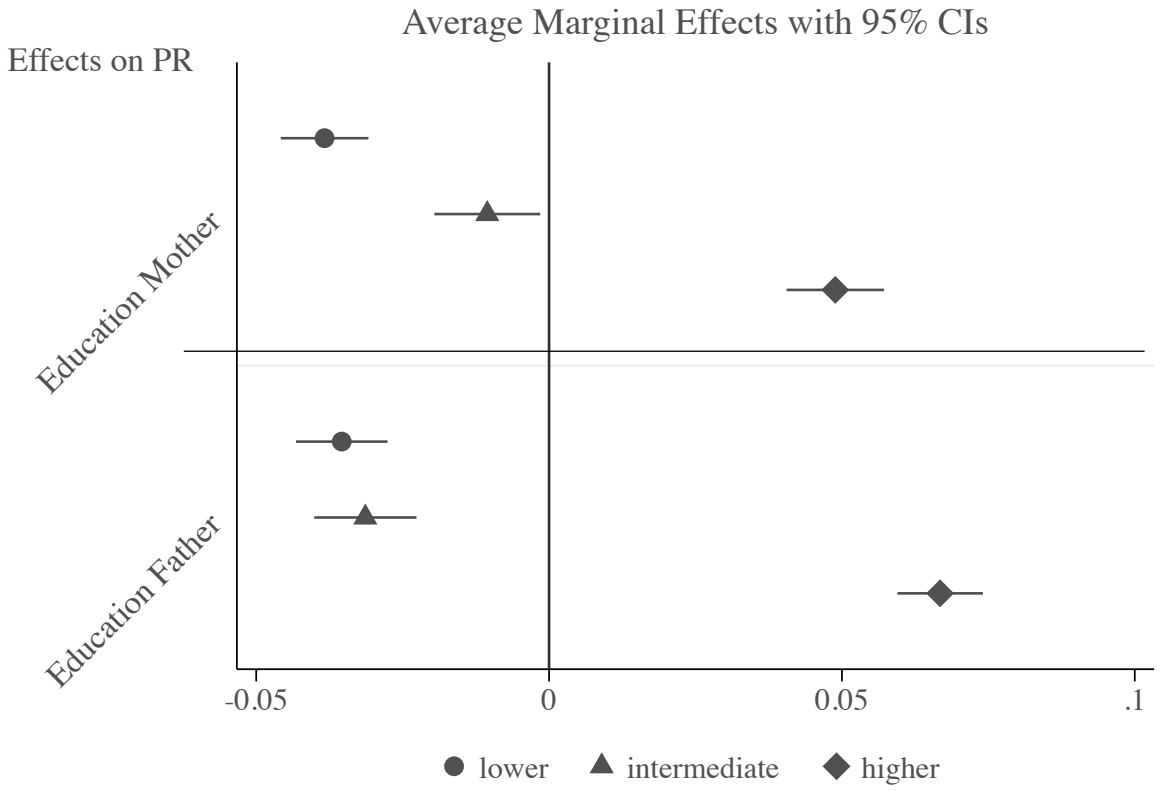
matched main and Youth Questionnaire Number of cases, column percentage below

The hurdles to change to the higher track are therefore minimised to deciding to continue, because a change of school is not necessary. Only about 5% of these children continue to the higher secondary track, which qualifies for universities. Children of fathers with intermediate secondary school degrees are about evenly distributed between higher and intermediate secondary education. Only about 14% of the children perform worse than their fathers. Looking at fathers with higher secondary degrees, the vast majority of children, about 78%, also attend higher secondary institutions. This group shows the most stable pattern.

Comparing these results with the results for the education of the mother in table 5.2, the pattern is very similar. This is explainable by, firstly, the high homogeneity in education within couples and, secondly, by a slight shift in the distribution of education among women. While the majority of men in this sample have an intermediate secondary degree, women are more evenly distributed across school types.

Figure 5.3 display the average marginal effects of a parent's education on children's school placement of the multinomial logit estimation, testing for the effect of parental education on children's school placement. The dependent variable is attending either a lower, intermediate or an upper secondary school. It presents the effects of parental education on school placement of the children without including any controls. The distance

Figure 5.3: Average Marginal Effects of parents' highest years of education on children's school placement



to the vertical zero-line indicates the size of the effect on the probability of attending a certain school type. The effect of the education of the mother is less strong for attending upper secondary schools in comparison to the father. The effects on the probability on attaining lower and intermediate schools are similar in size. Looking at the education of the father, they are the same. In comparison, the distance of upper secondary schools is by far bigger.

Table 5.3 presents a more detailed overview. The coefficients are Relative Risk Ratios (RRR). The interpretation of the RRR states, that with one unit of change in an independent variable, the relative risk of the referring group to the reference group on the outcome changes by the factor of the coefficient, when the other variables in the model are held constant. This means when the factor is smaller than 1 it decreases the chance of being in this group compared to the reference group. A factor greater than 1 increases

the chances. The reference group in this model is attending a lower secondary school. For example, the RRR of the education of the mother for attending an intermediate secondary school, is 1.23. This means, with one more year of education of the mother, the risks of attending an intermediate school compared to attending a lower secondary school is increased by the factor of 1.23. When values are smaller than 1, the difference between the value and 1 can be interpreted as the percentage by which the risk is reduced.

Model 1 contains only the effects of parental education on school placement. In model 2 the control variables are added. Those include the year of birth and the gender of the child, EGP of both the father and the mother, the household income and whether the child has a foreign father. In model 3, the personality variables of the parents are introduced. What is of interest for the research question, is whether the coefficients of parental education change from model 2 to model 3 and to model 4, that includes children's personality traits. Another interest is the rise in the pseudo R squared. It cannot be interpreted as percentage of explained variance of the dependent variable, however a rise of pseudo R squared indicates a better model fit.

Starting with the coefficients of the intermediate secondary group, across models, the education effect of the mother is relatively stable (ranging from 1.18 in model 4 to 1.28 in model 3). All of them indicate that with higher parental education it is more likely to be in intermediate secondary than in lower secondary. When introducing the control variables in model 2, the education effect of the father is not significant any more (a drop from 1.16 to 1.11), however, the EGP variables of both mother and father indicate significant effects on the school placement. Income has no effect in model 2. When introducing the personality variables of the parents, four major changes happen: First, the education effect of the father becomes significant again. Second, being a boy becomes significant, indicating that controlling for the personality of the parents, boys have a 39% lower risk of attending intermediate secondary. Third, when we observe in model two, how the EGP captured the education effect of the father, personality strongly mediates the EGP categories, however not the education. Fourth, income has not a significantly positive effect on attending intermediate secondary. The personality of the child seems

to mediate parental education, but only weakly. This will be explicitly tested later on. So far, regarding the hypotheses, there is little to no indication that personality mediates the effect of parental education on children's school placement. In this model, from all personality traits, only Openness for Experiences and Agreeableness of the mother have a significant effect (both>1).

The second part of the table shows the effects of attending and upper secondary school rather than a lower secondary school. The effects for parental education are higher than in the previous section and robust across all four models. Here too, personality of the parents reduces the effects of the EGP of the father. In contrast to income in intermediate secondary schools, income increases the chances of being in upper secondary school. Among the children in upper secondary school, as before, Openness for Experiences and Agreeableness of the mother have a significant positive effect on the risks of attending upper secondary school. Additionally, higher (intrinsic) Locus of Control of the father and the child increase the risk of attending upper secondary school. The second significant personality trait is Openness for Experiences, where a higher degree of Openness positively affects attending upper secondary school. Pseudo R squared steadily rises across the models when adding variables, indicating personality does increase model fit.

Table 5.3: Multinomial logistic regression, Relative Risk Ratios with robust standard errors, average marginal effects of attending intermediate secondary or upper secondary' school

	(1)	(2)	(3)	(4)
Lower secondary – Reference				
Intermediate secondary				
Mother's education	1.23***	1.19**	1.28***	1.18**
Father's education	1.16**	1.11	1.14**	1.13*
Year of birth		1.13	1.02	1.12
Gender (1=boys)		0.70	0.61***	0.62*
EGP father				
(Reference=inactive)				
Unskilled &				
farm labour		0.47	0.65	0.41
Skilled manual		0.04***	0.60	0.04***

Table 5.3 continued

	(1)	(2)	(3)	(4)
Self-employed		0.04**	0.40*	0.05**
Routine non-manual		0.16*	0.73	0.14*
Low service		0.11**	0.77	0.11**
High service		0.18	0.99	0.15
EGP mother				
(Reference=inactive)				
Unskilled &				
farm labour		3.08	2.04**	3.23
Skilled manual		33.04***	1.97*	34.72***
Self-employed		32.65**	3.06**	26.39**
Routine non-manual		9.81**	2.30**	10.03**
Low service		13.40***	2.45**	13.48***
High service		13.38**	1.61	14.58**
Household income		1.39	1.51**	1.35
Father German (1=yes)		1.49	1.31	1.36
Personality mother				
Openness			1.24**	
Conscientiousness			0.85	
Extraversion			0.95	
Agreeableness			1.32***	
Neuroticism			1.02	
Locus of Control			0.98	
Personality father				
Openness			0.88	
Conscientiousness			1.10	
Extraversion			1.03	
Agreeableness			0.86	
Neuroticism			1.01	
Locus of Control			1.03	
Personality child				
Openness				1.20
Conscientiousness				0.89
Extraversion				0.92
Agreeableness				0.92
Neuroticism				0.91
Locus of Control				1.61**
Upper secondary				
Mother's education	1.55***	1.48***	1.52***	1.46***
Father's education	1.69***	1.57***	1.56***	1.61***
Year of birth		1.16*	1.01	1.17**
Gender (1=boys)		0.48***	0.42***	0.48***

Table 5.3 continued

	(1)	(2)	(3)	(4)
EGP father				
(Reference=inactive)				
Unskilled &				
farm labour		0.26	0.74	0.20
Skilled manual		0.03**	0.73	0.03**
Self-employed		0.03**	0.53	0.02**
Routine non-manual		0.17	1.12	0.15
Low service		0.06*	1.12	0.04*
High service		0.15	1.13	0.10
EGP mother				
(Reference=inactive)				
Unskilled &				
farm labour		3.69	2.01	4.41
Skilled manual		31.59**	2.19*	35.19**
Self-employed		43.50**	3.83**	37.44**
Routine non-manual		7.18	2.75**	7.55
Low service		12.30*	2.13	13.79
High service		11.10*	2.10	13.18
Household income		3.15***	2.66***	3.10***
Father German (1=yes)		1.90	1.51	2.06
Personality mother				
Openness			1.22**	
Conscientiousness			0.92	
Extraversion			0.97	
Agreeableness			1.28**	
Neuroticism			0.96	
Locus of Control			0.79	
Personality father				
Openness			0.93	
Conscientiousness			0.95	
Extraversion			1.02	
Agreeableness			0.88	
Neuroticism			1.09	
Locus of Control			1.53**	
Personality child				
Openness				1.62***
Conscientiousness				0.87
Extraversion				0.89
Agreeableness				0.96
Neuroticism				0.98
Locus of Control				1.61**

Table 5.3 continued

	(1)	(2)	(3)	(4)
N	810	810	810	810
pseudo R^2	0.18	0.21	0.23	0.24

Exponentiated coefficients; Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

GSOEP combined Youth Questionnaire and main questionnaire

In table 5.3 the effect on parental education show a remarkably stability over the different models. Table 5.4 presents the results for KHB decomposition based on the models from table 5.3. The coefficients compare the 'reduced' model, the one with less variables, compared to the 'full' model, where the mediating variables are added. The 'difference' is the exact difference between the full and the reduced coefficient[3]. The z-test tests the H_0-hypothesis for $\Delta > 0$. A significant negative difference would be a mediation effect, a significantly positive effect would indicate a suppression effect. Neither is the case in this analysis for personality. There is no evidence supporting hypothesis H2. There is no mediating effect of personality on education.

There are two significant changes in coefficients: The influence of the education of the father becomes smaller when introducing socio-economic background variables, however, only on the probability of attending an intermediate or upper secondary school. The change in effects of attending an intermediate secondary school is not visible in table 5.3 because of rounding the two coefficients up and down to two digits after the comma. A presentation of the model with Average Marginal Effects with robust standard errors is presented in the Appendix, table E.

5.4.2 Between Differentiation, But Not Within – The Influence of Parental Education on Grades and Personality as a Mediator

Tables 5.5 – 5.7 present the results for the influence of parents' highest years of education on children's maths grades, separated by school type, referring to hypothesis H3. Over

[3]Please note that the values are rounded.

Table 5.4: KHB decomposition for parents' highest years of education on children's school placement and personality

Tested models	Parent	β	KHB estimator	$P > \|z\|$
Model 1 vs. Model 2	Mother	Reduced	0.22	0.00
Outcome: Intermediate Secondary		Full	0.20	0.00
		Diff	0.01	0.53
	Father	Reduced	0.26	0.00
		Full	0.14	0.11
		Diff	0.12	0.04
Model 1 vs. Model 2	Mother	Reduced	0.47	0.00
Outcome: Upper Secondary		Full	0.42	0.00
		Diff	0.04	0.17
	Father	Reduced	0.66	0.00
		Full	0.50	0.00
		Diff	0.17	0.01
Model 2 vs. Model 3	Mother	Reduced	0.20	0.01
Outcome: Intermediate Secondary		Full	0.17	0.02
		Diff	0.03	0.95
	Father	Reduced	0.13	0.15
		Full	0.17	0.07
		Diff	-0.04	0.92
Model 2 vs. Model 3	Mother	Reduced	0.42	0.00
Outcome: Upper Secondary		Full	0.39	0.00
		Diff	0.03	0.95
	Father	Reduced	0.50	0.00
		Full	0.55	0.00
		Diff	-0.05	0.93
Model 2 vs. Model 4	Mother	Reduced	0.20	0.00
Outcome: Intermediate Secondary		Full	0.20	0.00
		Diff	0.01	0.97
	Father	Reduced	0.14	0.11
		Full	0.15	0.09
		Diff	0.01	0.98
Model 2 vs. Model 4	Mother	Reduced	0.42	0.00
Outcome: Upper Secondary		Full	0.41	0.00
		Diff	0.02	0.97
	Father	Reduced	0.50	0.00
		Full	0.50	0.00
		Diff	0.00	0.99

GSOEP combined Youth Questionnaire and main questionnaire

Results based on table 5.3

all three table, there is only one significant effect for parental education affecting grades. Mothers' education in intermediate secondary schools (table 5.6) with a rise in grades by 0.08 for each additional year of education when controlling for year of birth and gender, socio-economic background variables and personality of the parents (model 3). The second significant effect is found in table 5.5 for upper secondary schools, also in model 3 and in the education of the mother. Both effects imply better grades with higher education of the mother.

A possible problem of the models could be the low case number. This is due to splitting the samples into the three different school types and holding the n constant over models to make them comparable. The case numbers themselves are less of a problem. The case numbers might be considered low for a standard sociological model, however, in technical terms, the models are not over-specified, which means they have sufficient degrees of freedom compared to the number of effects to be estimated. This means that even though the case number is rather low, they do allow substantive interpretation. A problem would arise if the cases were not missing at random (MAR) or not missing completely on random (MCAR). To test whether data violates this assumption with regard to maths grades, I conducted a Little's MCAR test. Results did not suggest systematic missing values. Having excluded this factor, the presumption of having used variables of low explanatory power on maths grades remains. R^2 and adjusted R^2 indicate that the variables in the model are not very well suited to explain variations in grades. The values for both are rather low.

Table 5.5: OLS regression parents' years of education on maths grades in lower secondary school

	(1)	(2)	(3)	(4)
Mother's education	−0.04	−0.07	−0.07	−0.06
Father's education	0.01	−0.08	−0.02	−0.11
Year of Birth		0.14**	0.02	0.15*
Gender (1=boys)		0.16	0.18	0.09
EGP father				
(Reference=inactive)				

Table 5.5 continued

	(1)	(2)	(3)	(4)
Unskilled &				
farm labour		−0.23	−0.15	−0.37
Skilled manual		0.26	0.13	0.11
Self-employed		0.66	0.58	0.67
Routine non-manual		0.50	0.28	0.52
Low service		0.32	−0.23	0.33
High service		0.62	0.32	0.78
EGP mother				
(Reference=inactive)				
Unskilled &				
farm labour		0.22	0.14	0.35
Skilled manual		0.15	−0.19	0.23
Self-employed		−0.71	−1.01**	−0.54
Routine non-manual		0.20	−0.13	0.23
Low service		−0.01	−0.20	−0.02
High service		0.09	−0.05	−0.05
Household income		−0.13	0.04	−0.07
Father German (1=yes)		0.13	0.23	0.09
Personality mother				
Openness			0.04	
Conscientiousness			0.06	
Extraversion			−0.19**	
Agreeableness			−0.02	
Neuroticism			−0.03	
Locus of Control			−0.06	
Personality father				
Openness			0.02	
Conscientiousness			0.03	
Extraversion			0.04	
Agreeableness			0.01	
Neuroticism			−0.11	
Locus of Control			−0.07	
Personality child				
Openness				−0.16*
Conscientiousness				0.05
Extraversion				−0.02
Agreeableness				0.03
Neuroticism				−0.06
Locus of Control				−0.19
Constant	4.33***	−368.41**	−52.90	−374.65**
N	110	110	110	110

Table 5.5 continued

	(1)	(2)	(3)	(4)
R^2	0.002	0.06	0.11	0.091
Adj. R^2	0.009	0.038	0.028	0.040

GSOEP combined Youth Questionnaire and main questionnaire

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5.6: OLS regression parents' years of education on maths grades in intermediate secondary school

	(1)	(2)	(3)	(4)
Mother's education	0.05	0.03	0.08***	0.03
Father's education	0.03	0.06	0.03	0.07
Year of Birth		−0.00	0.02	−0.02
Gender (1=boys)		0.13	0.14*	0.15
EGP father				
(Reference=inactive)				
Unskilled &				
farm labour		0.45	0.06	0.66*
Skilled manual		0.27	0.13	0.29
Self-employed		0.24	0.06	0.14
Routine non-manual		−0.24	0.08	−0.38
Low service		0.24	0.09	0.28
High service		0.09	0.07	0.05
EGP mother				
(Reference=inactive)				
Unskilled &				
farm labour		−0.67	−0.05	−0.79**
Skilled manual		−0.48	−0.01	−0.42
Self-employed		−0.46	0.00	−0.34
Routine non-manual		0.34	0.23	0.47
Low service		−0.43	0.01	−0.43
High service		−0.59	−0.05	−0.45
Household income		−0.06	−0.03	−0.02
Father German (1=yes)		0.12	0.06	0.12
Personality mother				
Openness			−0.10**	
Conscientiousness			0.06	
Extraversion			0.05	
Agreeableness			−0.12**	
Neuroticism			−0.11***	

Table 5.6 continued

	(1)	(2)	(3)	(4)
Locus of Control			−0.09	
Personality father				
Openness			−0.07	
Conscientiousness			0.09	
Extraversion			0.04	
Agreeableness			−0.01	
Neuroticism			0.07	
Locus of Control			−0.05	
Personality child				
Openness				−0.04
Conscientiousness				0.22***
Extraversion				−0.02
Agreeableness				−0.03
Neuroticism				−0.03
Locus of Control				−0.02
Constant	3.04***	−1.48	−16.65	25.16
N	261	261	261	261
R^2	0.015	0.068	0.075	0.108
Adj. R^2	0.008	0.006	0.021	0.026

GSOEP combined Youth Questionnaire and main questionnaire

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5.7: OLS regression parents' years of education on maths grades in upper secondary school

	(1)	(2)	(3)	(4)
Mother's education	0.02	0.03	0.04*	0.04
Father's education 0.04	0.04	0.03	0.02	
Year of Birth		0.02	0.01	0.03
Gender (1=boys)		−0.05	−0.08	0.06
EGP father				
(Reference=inactive)				
Unskilled &				
farm labour		−0.57	−0.31	−0.66
Skilled manual		−1.17*	−0.47*	−1.45**
Self-employed		−0.39	−0.18	−0.76
Routine non-manual		−0.45	−0.40	−0.60
Low service		−0.91*	−0.42	−0.97**

Table 5.7 continued

	(1)	(2)	(3)	(4)
High service		−0.40	−0.31	−0.51
EGP mother				
(Reference=inactive)				
Unskilled &				
farm labour		0.24	−0.03	−0.01
Skilled manual		0.88	0.24	0.90
Self-employed		−0.08	−0.04	0.10
Routine non-manual		0.07	0.02	−0.05
Low service		0.36	0.20	0.22
High service		0.03	0.12	−0.09
Household income		−0.07	−0.07	0.04
Father German (1=yes)		0.88***	0.68***	0.70**
Personality mother				
Openness			0.00	
Conscientiousness			−0.03	
Extraversion			−0.10**	
Agreeableness			0.07	
Neuroticism			−0.02	
Locus of Control			−0.01	
Personality father				
Openness			−0.06	
Conscientiousness			0.07	
Extraversion			0.01	
Agreeableness			−0.03	
Neuroticism			−0.02	
Locus of Control			−0.10	
Personality child				
Openness				−0.05
Conscientiousness				0.35***
Extraversion				−0.07*
Agreeableness				−0.04
Neuroticism				−0.00
Locus of Control				0.10
Constant	3.43***	−43.89	−20.71	−49.83
N	389	389	389	389
R^2	0.011	0.063	0.053	0.216
Adj. R^2	0.006	0.023	0.0172	0.169

GSOEP combined Youth Questionnaire and main questionnaire

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.5 Summary and Discussion

This chapter aimed to identify the effect of personality on the reproduction of educational inequality, including both the role of the fathers' and the mothers' education. Personality was introduced as a possible mediator in this process. All models, for the youth cohort as well as older cohort showed a consistent positive effect of parental education on children's educational attainment, which was measured by school placement for younger cohorts and by highest level of education reached for older cohorts. The cross-tabulation between the education of the parents and the children revealed high stability for the higher educated. In the youth cohort, more than three quarters children with parents with high education attend the highest school track themselves, and the only one that leads to academic tertiary education.

H1 aimed towards a mediating effect of personality on the effect of parental education on children's school placements. There was no evidence to support this hypothesis. A post-hoc finding was the strong mediation of parental personalities on the effects of the EGP categories. This finding suggests that there might be a closer relationship between the EGP categories and personality rather than education. Further research could concentrate on working conditions and class environments rather than education. It could aim at socio-economic status; however income and education have been fairly robust under control of personality. The personality of the mother, Openness and Agreeableness showed strong influence on school placement in intermediate and upper secondary schools compared to lower secondary, whereas the fathers' Locus of Control only increased risks of attending upper but not intermediate secondary schools. The same applies to Openness and Locus of Control of the children. A shortcoming of this study is the lack of information at the time in which the transition takes place. The SOEP has already implemented a new sample, following children from birth. Similarly, the National Education Panel Study (NEPS) will provide possibilities for this analysis in the future, given that personality measures of parents and children are comparable.

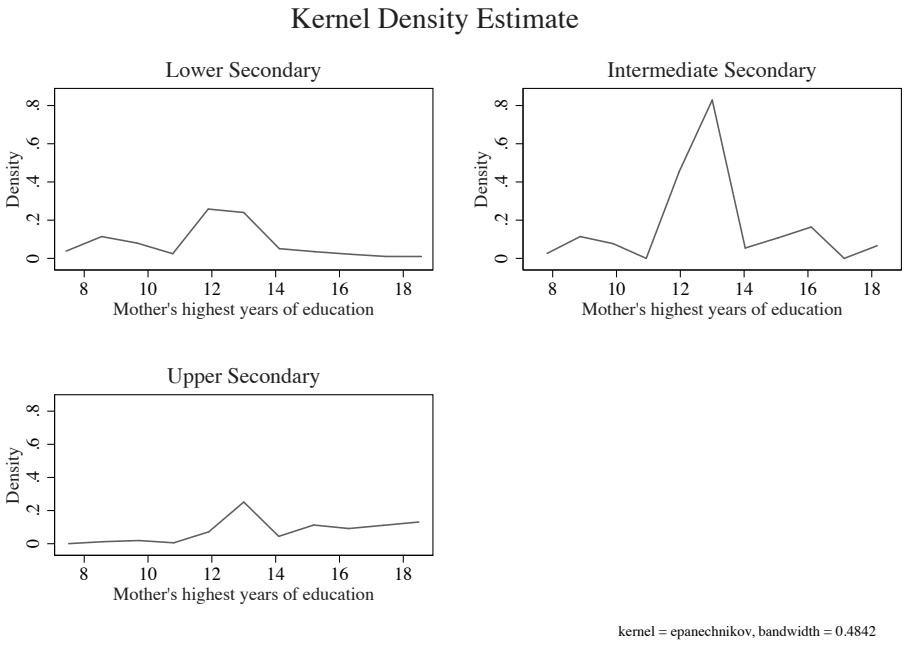
When looking at academic performance in terms of grades, positive effects are found for the education of the mother on maths grades in intermediate secondary school and

for the education of the father in upper secondary school. This result brings up further questions, when thinking of possibilities why one parent would be more important than the other across different school types. One idea would be to say that the education of the mother has the biggest influence for the in-between categories due to higher heterogeneity of parental care, which is a result of self-selection of students into school types by parental education. While the good students perform well and the bad students perform badly on a cognitive basis, no matter what parental background they have, the ones in the middle, in this case the students attending intermediate secondary schools, are strongly influenced by the education of the mother, which is centred around an intermediate level of education, in intermediate secondary schools. In contrast, children in upper secondary school have mostly highly educated parents and children in lower secondary school have mostly lower educated parents. This, however, does not explain why it is the influence of the mother and not of the father, and also not why it is the father's influence in upper secondary schools, that influences grades. This idea is rather speculative, but nevertheless supported when looking at the distribution of mothers' education over school types (figure 5.4). Generally, parental education nor other socio-economic measures such as the EGP and income were good predictors for maths grades when differentiated between different types of schools. Similarly, personality only weakly added explanatory power to the model. Because there was no effect to be mediated, H2 could not be supported.

A very recent study by Ryberg et al. (2017) came to similar results: They summarised findings of mediation and compensatory effects of personality in other countries, mainly the states, but they did not find these effects for Germany, also using the SOEP.

A main finding is the high impact of parental education on school placement against the low impact on grades. I suggest two explanations: First, parental education has only limited impact on educational attainment of the child. In other words, the effect is visible the clearest when looking at the overall distribution of educational attainment, but when looking at the 'fine tuning', the grades within the three school types, it is not visible any more. Second, a more substantial than technical explanation in the context of secondary effects: Parents push their children into the highest school type possible, more or less

Figure 5.4: Distribution of years of education of the mother for 17-year-olds



SOEP main questionnaire

regardless of their actual performance, but within the legal range. The legal range means in this context following the limitations of the transition laws (defined by grade marks) in the federal states.

In other words, the results are an indicator of parents with higher education pushing the children into higher education, more or less independently of their grades (Erikson et al., 2005), e.g. through higher educational aims, a better knowledge of the school system or status maintaining mechanisms. Following this logic and the argument of the theory of maximally maintained inequality, higher educated parents find different ways to maintain the family status other than investing the educational advantage in better performance of the children, however, they do not influence the performance within a school type, once placed into a track.

The hypothesis stated that personality has a mediating effect on the educational parent-child relationship. This was not the case in the younger cohort. Whether there is a relationship between personality and educational outcomes and to what extent, will be under research in the following chapter.

An unexpected finding related to the control variables: While parental education was the main driver of children's school placement, the effect of income was negligible except in one model. One of the main reasons could be the investigation of schools rather than higher education. While sending children to universities or other tertiary educational institutions causes direct and indirect costs, secondary school is free of charge. The outcome of school placement is therefore more independent from the financial situation than the decision of participating in tertiary education would be. Furthermore, the difference in educational attainment between boys and girls in birth cohorts from 1983 to 1994 is underlined by this analysis. The advantage of girls that is commonly cited in late literature (DiPrete and Buchmann, 2013; Buchmann et al., 2008; Goldin et al., 2006), is more pronounced in the model for the younger cohorts of the youth questionnaire.

A promising approach on this topic for the future concerns to what extent different groups, e.g. different classes are affected by personality in different ways. The study of Damian et al. (2015) for instance studied whether personality could compensate for the disadvantage of kids with low socio-economic background. They found personality helping children to compensate the disadvantage of their low socio-economic background, but only to a very small degree.

6 A Question of Socialisation? The Transfer of Personality across Generations

Scientists' opinions differ considerably about the transfer of entities from parents to children. While some biologists argue that up to 80% of intelligence is genetically determined, at the other end, some sociologists hold the view that it is all down to socialisation. In fact, it is very difficult to find proof, most likely it is an interplay between genes and environment (Shanahan et al., 2008). It is, however, possible to show whether the relationship between parental and children's personality can be explained by a measurement for socialisation. This section provides an investigation of systematic similarities in personality between parents and children and to what extent the development or rather transmission of noncognitive skills depends on socialisation.

The first analysis aims to establish whether there is a (positive) systematic relationship between parental and children's personality. Whether it is genetically fixed or transferred by socialisation is, for the time being, unknown. In the second step, however, we can show to what extent socialisation explains this relationship by using a proxy, namely 'supportive parenting'. Supportive parenting might not mirror all aspects of socialisation, but has been acknowledged as an important factor in the socialisation process because it measures the intensity, quantity and the quality of the social interactions between parents and children. It addresses the inclusion of children in family decisions as well as fostering activities of the parents in terms of caring about their children's problems and

showing appreciation and love. Supportive parenting is seen as a major antecedent of a healthy development of resilience of children (Rutter, 1985), which is the ability to handle difficulties in life, as well as other important soft skills such as school adjustment (Pettit et al., 1997). Supportive parenting is a major factor for children to be able to develop a healthy and adequate personality (Amato, 1990). On the other hand, low supportive parenting has been found to play a significant role in the development of violent and deviant behaviour (Simons et al., 1998).

The third research are of this thesis focuses on the transfer of personality traits from parents to children. There is a long-standing discussion about how and to what extent personality is transferred from parents to children. Research such as Kagan (1997); Plomin and Caspi (1999); Plomin et al. (1993); Plomin and Bergeman (1991) argue that the influence of genetic factors are a main determinant of personality. Kagan (1997) conducted a twin study over a ten year period and found that up to 80% of personality could be explained by genetic factors.

On the other hand, researchers have long acknowledged that personality develops over time and is, therefore, also influenced by factors other than genetic and many scientists now assume that personality is influenced by both genes and the environment (for an overview over the debate see Caspi and Roberts, 1999; Hopwood et al., 2011; Shanahan et al., 2008). While earlier research claimed malleability of personality until later in life (e.g. Erikson, 1950), later research described personality as rather stable (comp. 4.1).

The theory of class specific socialisation of children arose in the 1980s by Kohn (1983), who refers to work on socialisation processes in the 50s and 60s, (e.g. Kohn, 1963; Lepsius, 1963). The theory is mainly based on two ideas: Differences in life conditions in different social classes, particularly working conditions, that influence values, and how these values, namely the degree of self-direction and authority, influence behaviour in the job. These differences in values lead to class specific socialisation of children, who develop a class typical behaviour themselves. Working class jobs are characterised by more authorial and conformist attitudes while middle and upper class positions need a higher degree of self-directional behaviour. Referring to this theory, personality traits indicating a

high degree of self-direction and adequate social adaption lead to better educational outcomes. The mechanisms behind this are the early ability for self-directed learning and the application of gained knowledge. Furthermore, the behaviour and language of children from middle and upper class background are in accordance with teacher's own behaviour and expectations, since they are to a large extent middle class themselves.

Hynes (1985) found that for Ireland the link between values and socialisation did not support the hypothesis of early socialisation. He emphasised, however, he emphasised the role of the mother as main socialising person whereas so far, studies only measured the class of the father. The upbringing of the mother and her education could be a possible factor influencing the socialisation process of the child. Kohn's original theory (Kohn et al., 1986) contradicts the psychological view on the development of personality, in which personality is formed during youth and childhood and is considered to be relatively stable during adulthood, whereas Kohn argues, that the values are formed by working conditions. This argument is emphasised by the fact that Kohn's theory does not consider more than two generations and therefore neglects cohort effects, e.g. in working conditions, political context and changes in the relative social positions. Inter-generational status mobility must come with a change of values within a generation and therefore of a change in children's socialisation. Following his causal chain, inter- and intra-generational status mobility is not convincingly explainable. The theory emphasises stability and excludes mobility, while the psychological view on socialisation assumes that, as with Kohn, values are passed from the parents to the children, but differing in the assumption that these values are also able to cause change in socio-economic mobility. However, in later studies, especially in cross-national studies, he admits that the relationship between work activity and personality is reciprocal rather than one-directional (Kohn, 2006; Kohn et al., 2000).

While research has identified many non-genetic elements that can influence personality, parental influence has consistently been identified as a main factor of this process (e.g. Caspi and Roberts, 2009). It has been widely established that socio-economic determinants such as parental status are positively correlated with children's development. Higher class parents possess the knowledge and monetary and non-monetary resources to

support their children's development (Bianchi, 2006; Bowles et al., 2005; Farkas, 2003). Non-monetary resources can for instance include time, level of parental education and the use of external childcare or parenting style. Researchers suggest that policies targeting interventions in early childhood inequalities have a positive effect on reducing future inequalities (Carneiro and Heckman, 2003; Esping-Andersen, 2009). While many monetary and non-monetary resources cannot easily be changed, parenting style might offer a promising area of intervention. One measure of how the influence of parenting on personality is the concept of 'supportive parenting'.

Supportive parenting might not mirror all aspects of socialisation, but has been acknowledged as an important factor in the socialisation process because it measures the intensity, quantity and the quality of the social interactions between parents and children. It addresses the inclusion of children in family decisions as well as fostering activities of the parents in terms of caring about their children's problems and showing appreciation and love. Supportive parenting is seen as a major antecedent of a healthy development of resilience of children (Rutter, 1985), which is the ability to handle difficulties in life, as well as other important soft skills such as school adjustment (Pettit et al., 1997). Supportive parenting is a major factor for children to be able to develop a healthy and adequate personality (Amato, 1990). On the other hand, low supportive parenting has been found to play a significant role in the development of violent and deviant behaviour (Simons et al., 1998, 1993).

Only one study has previously attempted to investigate the relationship between all three components parent personality, child personality and parenting style. Schofield et al. (2012) conducted a study of approximately 347 two-parent families in Iowa over a period from 1990 to 1994. Families were visited every second year and required to fill in questionnaires about family processes, individual family member characteristics, socio-economic circumstances, parents, beliefs about parenting, and plans for the future Schofield et al. (2012, p. 5). Adolescents were assessed in $10^{th} grade and 12^{th} grade. Both parents' and adolescents' persona$
$Factor Inventory (NEO-FFI). For measuring personality, the abbreviated version of the Multidimensi$

To investigate parenting, the researchers examined videos, which were recorded for two

structured interaction tasks: A family discussion task and a family problem solving task. The videos were then analysed to identify hostility and angry, coercive, and antisocial behaviour toward the child, as well as parent's warmth, pro-social responses, and positive assertiveness. The researchers tested and confirmed three hypotheses: First, parents' personality predicts observed parenting, second, parental personality traits are associated with adolescents' personality traits and third, high levels of parental warmth and low levels of hostility positively predict adolescent personality traits.

The study notes some important limitations. First, the study's sample is ethnically homogeneous and while there are indicators that the results might be replicable in different settings. Furthermore, in the second survey, adolescents' personality was measured by the MPQ, while the first survey contained the Big Five. Last, the study focused on alpha-linked traits Agreeableness, Neuroticism, and Conscientiousness, neglecting Openness to Experience and Extraversion. The great advantage of this study are the precise and rich measurement of supportive parenting and the repeated measurements over time. This is not available in the SOEP. However, it provides information over a representative population in Germany, rather than a very small selective sample. The measure for supportive parenting in this study is the perceived supportive parenting style from the adolescent.

6.1 Hypotheses

Following Kohn's later theories (Kohn, 2006; Kohn et al., 2000), children experiencing a high amount of supportive parenting should develop stronger development of beneficial personality traits (referring to subsection 4.6.2). This means higher values in Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Locus of Control. An exception to this should be Neuroticism, for which stronger occurrence means a less healthy mental state. For Neuroticism, supportive parenting should have a negative effect.

The theoretical assumption was that useful personality traits are transmitted by the parents and through parenting. The first question is, whether there is similarity between

parents' and children's personality traits. Second, I will investigate whether (perceived) supportive parenting fosters positive personality traits in children. As a last step, it will be examined if the transfer of personality from parents to children can be explained by supportive parenting.

H1: There is a systematically positive relationship between parents' and children's personalities.

H2: The development of personality is stronger with high supportive parenting compared to low supportive parenting, except for Neuroticism, where high support leads to a lower degree of Neuroticism.

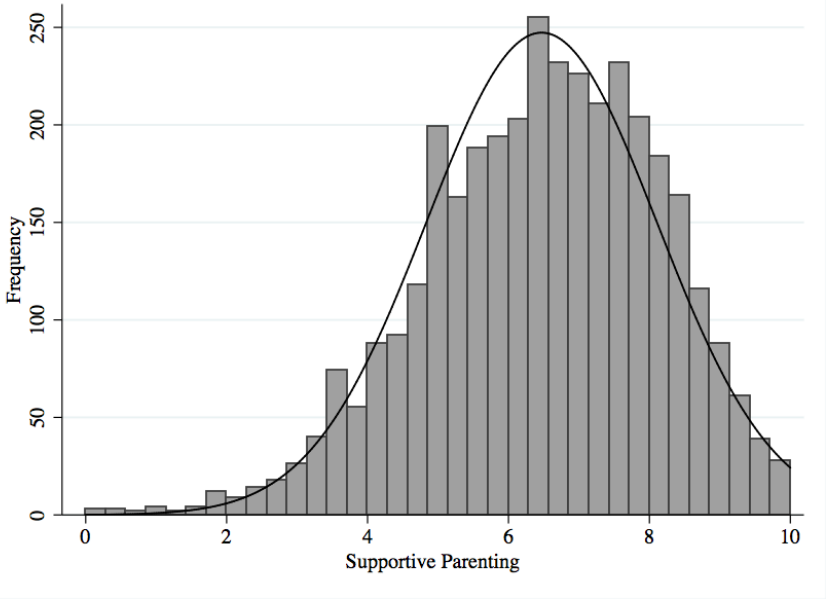
H3: The effect of parents' on children's personalities can be explained by supportive parenting.

6.2 Method

6.2.1 The Similarity between Parents' and Children's Personality

To see whether there is a systematic relationship between parents' and children's personality, a correlation analysis for all personality traits is conducted. For this purpose, indices for the personality traits of the children as well as of their parents are coded and correlated. The Pearson product-moment correlation coefficient is used assuming personality traits as continuous variables and a linear relationship between the two correlated constructs. Neither previous research nor my hypotheses say anything about differences in the transfer of personality regarding mothers and fathers or boys and girls. To assess the similarity between the parents and children and to consider possible differences, I will conduct a correlation analysis, divided by gender.

Figure 6.1: Distribution of supportive parenting from 0‘never’ to 10‘very often’



6.2.2 Personality Development and Parenting Style

To examine the differences between groups of parenting styles, first a simple group comparison in the form of a t-test of children with parents with supportive parenting style and children experiencing low supportive parenting is conducted. Supportive parenting is measured as the grand mean of all its nine items for mother and father. It is skewed towards a highly supportive parenting style (figure 6.1). To compensate for the skewness cut-offs were done on the upper and lower quartile. The upper and lower 25% have a reasonable amount of variation between the two groups as well as a reasonable number of observations for the analysis. A one-tailed t-test is calculated for the personality traits of the children by low or high supportive parenting style. Tests for robustness of $+/-5\%$ do not show significant changes in the results. Then a Blinder-Oaxaca-Decomposition analysis (Blinder, 1973; Oaxaca, 1973) is conducted. This method is a counterfactual decomposition that makes it possible to identify the explanatory power of joint items between different groups on a dependent variable. The analysis decomposes the estimated differences of predicted values from an OLS-estimation with given control variables between two groups (here children with low and high supportive parenting) into an explained part (‘endowments’) and an unexplained part (‘coefficients’). The explained part shows

how the difference would be reduced if one of the groups would have the distribution of x of the other group. The unexplained part shows the differences due to differences in intercept that are not explained by the variables in the model. From this it is followed that the difference between the estimate of the first group and the hypothetical estimate for the second group can be explained by a different distribution of x between the two groups ('endowments'), while the unexplained part is the remainder of the difference between the hypothetical and the true value for the second group. Based on this inclusion of distributions rather than on mere differences in average, the decomposition counts as a type of counterfactual analysis (Jann, 2008). The aim of counterfactual analyses is to produce something that comes close to a causal effect by imitating as many assumptions as possible for a causal inference.

For demonstration purposes, the following example is considered in more detail. To investigate how a personality trait P differs between the groups of children experiencing high supportive parenting (H) and low supportive parenting (L). β can be the coefficient any explanatory variable, e.g. education of the parents (E).

$$P_L = \alpha_L + \beta_L E_L + \eta_L \tag{6.1}$$

$$P_H = \alpha_H + \beta_H E_H + \eta_H \tag{6.2}$$

$$P_L^* = \alpha_H + beta_H E_L + \eta_L \tag{6.3}$$

$$\bar{P}_H - \bar{P}_L = (\bar{P}_H - \bar{P}_L^*) + (\bar{P}_L^* - \bar{P}_L) \tag{6.4}$$

$$\bar{P}_H - \bar{P}_L^* = \beta_H(\bar{E}_H - \bar{E}_L) \tag{6.5}$$

$$\bar{P}_L^* - \bar{P}_L = (\alpha_H - \alpha_L) + (\beta_H - \beta_L)\bar{E}_L \tag{6.6}$$

$$\bar{P}_H - \bar{P}_L = (\beta_H(\bar{E}_H - \bar{E}_L)) + ((\alpha_H - \alpha_L) + (\beta_H - \beta_L)\bar{E}_L) \tag{6.7}$$

Equation (1) and (2) show the equation for the linear regression where α is the intercept and η is the error term. If both groups were perfectly equal in distribution and level, $\bar{P}_H - \bar{P}_L$ would be zero. However, the group difference is not zero, so we are aiming to

explain what the difference $\bar{P}_H - \bar{P}_L$ is and how can it be explained. Therefore, we insert the estimated values for one group, here the high supportive group, into the equation of the other group, the low supportive (3). The asterisk indicates the hypothetical estimate that results from this equation. Equation (4) decomposes the differences between groups further, where the difference in the first bracket can be explained by differences in parental education, while the difference in the second bracket is the unexplained difference. Equation (5) presents the explained variation due to different group characteristics (endowments), while equation (6) presents the unexplained variation, the coefficients effect. Finally, equation (7) is the final equation, where (5) and (6) are inserted into our initial question of how to explain $\bar{P}_H - \bar{P}_L$.

Compared to a group comparison with structural equation modelling, the proposed model has several advantages: While adding control variables into an SEM leads to higher complexity and therefore less intuitively interpretable coefficients, in decomposition analysis, similar to regression analysis, additional variables allow us to come closer to the 'true' group difference. Second, the size of the influence of groups of explanatory variables as well as the size of the unexplained difference considering the distribution of X can be identified, whereas this is not possible with to single variables and average group differences in common OLS regressions. The disadvantage of this method compared to SEM is that the original structure of the latent variable cannot be modelled, and it has strong assumptions regarding variances of the error terms and the independence of variables.

In the literature on the gender wage gap, where decomposition methods are often applied, the unexplained part is usually interpreted as discrimination. However, technically speaking, it is merely the effect that is not explained by the (potentially unreliably measured) variables in the model and therefore to be attributed to remaining group differences. This limitation needs to be considered when interpreting the results (Jones and Kelley, 1984).

The treatment variable in a decomposition analysis should be strictly exogenous. This is the case for fixed attributes such as gender. In my analysis the treatment variable,

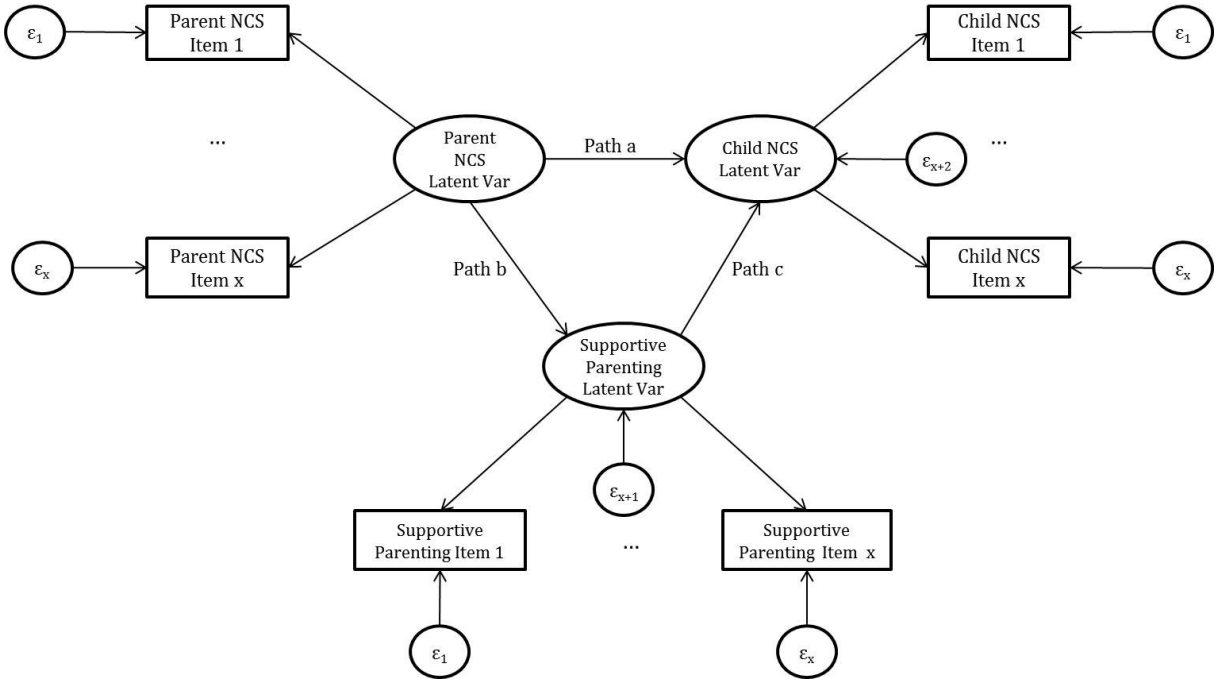
supportive parenting, is not necessarily exogenous. It can be a result of choices that are confounded with unobserved or observed variables, which are precedent to supportive parenting. Taking this into consideration, interpreting the results has some caveats that I will discuss later in the Results section.

For the Blinder-Oaxaca-Decomposition children's personality traits dimensions are coded into arithmetic means of the consisting items. Missing items are not considered, which means that when only two instead of three items are available, the mean over two items is calculated. As control variables the gender of the child, their year of birth and their parent's education are added. It is assumed that girls and boys might react differently to supportive parenting and that this might partly explain differences. The year of birth is controlled to see whether there are differences over the different cohorts in case supportive parenting has changed systematically over the years. Parental education is added in case there are differences in the distribution of supportive parenting, e.g. that highly educated parents have a tendency to demonstrate a high supportive parenting while low educated parents have a tendency to show low supportive parenting.

6.2.3 The Transfer of Personality Between Generations

The third hypothesis is tested by a mediation analysis (Baron and Kenny, 1986). A mediation analysis is a special type of path analysis, in which the effect of two variables is mediated by a third variable. Mediating means that the effect of the independent on the dependent variable is explained by the effect of the independent variable to the mediating variable as well as the effect from the mediating variable on the dependent variable. This is done with structural equation modelling. Another alternative would be to use a stepwise regression analysis, however, as discussed in Chapter 7, the original structure of the dimensions would get lost by using indices. Therefore, I prefer SEM to strengthen the argument. The model is shown in figure 6.2. Path a has two different meanings: First, it is the total effect of parental personality on children's personality if supportive parenting is excluded from the model. Second, it shows the direct effect which is the effect if supportive parenting is set as a mediating variable. The indirect effect

Figure 6.2: Model of the mediation analysis with SEM



is the difference between the total and the direct effect. If this difference is significant, we can speak of mediation. This is tested with Stata's postestimation command 'estat teffects', which decomposes, similar to the KHB estimator, the full model into the direct and indirect components. Significance is tested on hypothesis that the indirect effect is >0. Mothers' and fathers' separate personality traits and supportive parenting style are combined with parental personality traits and parental supportive parenting. The reason behind this is that previous analyses (not presented) have shown a high amount of collinearity between mothers and fathers. This means the coefficients cancel each other out and they are no longer interpretable.

6.3 Results

6.3.1 The Apple doesn't Fall Far From the Tree – The Similarity of Personality Between Two Generations

The first question was whether there is a direct effect between parental and children's personalities. Table 6.1 presents the results of the correlation analysis. Overall, the size of the correlation is comparably small, all are under 0.21. Except for Neuroticism, all the correlations are significant on a 1%-level. The correlation of Neuroticism between parents and children differs the most between genders. Between fathers and sons and daughters, and mothers and sons there is no correlation significant at the 10%-level. However, there is a strong correlation between the level of Neuroticism of the mother and that of the daughter.

For the other personality traits, there does not seem to be a systematic difference between mothers and fathers in their transmission of personality traits to daughters and sons. Agreeableness has a slightly higher correlation with the mother and the children as with the father, whereas for Conscientiousness the correlation is stronger with the father.

The second hypothesis addresses the question of whether there are differences in personality of the children are a result of experiencing different amounts of supportive parenting. Table 6.2 presents the results of a one-tailed t-test between children experiencing high or low supportive parenting. The tested hypothesis is for all personality traits that the average is higher for children with high supportive parenting, except for Neuroticism (last line) where the average should be lower. The table is to be read as following: In the group with high supportive parenting, the scores for Locus of Control ($M = 6.71, SD = 0.04$) were significantly higher than in the group with low supportive parenting ($M = 6.19, SD = 0.04$); $t(1897) = -9.51, p = 0.00$.

The results support the hypothesis. All of the personality traits are significantly higher in the high supportive parenting group, except for Neuroticism, where, according to the hypothesis, the score is lower. Considering the results of the previous chapter, this implies that favourable personality traits that lead to higher educational attainment are

encouraged by a supportive parenting style.

To consider the role of supportive parenting in more depth, the Blinder-Oaxaca-Decomposition is conducted, one for each personality trait, controlling for gender, year of birth, type of school, parental education, EGP, monthly household net income and personality traits of the parents (table 6.3). The first part, the differentials present the differences in predicted means for the children that experienced low and high supportive parenting. The differences between these groups are significant in all personality traits but Neuroticism. This means that children with either low or high supportive parenting do not differ significantly in means regarding Neuroticism.

The second part of the table, the explained part (endowments), presents the results that are due to differences explained by the different distribution of x-variables between the two groups. Significant effects can be found in the individual characteristics (table

For Locus of Control, Openness for Experiences, Conscientiousness, Extraversion and Agreeableness this difference is negative while there is no effect for Neuroticism. This indicates that children who experienced a high amount of supportive parenting develop stronger personality traits than children who experienced low supportive parenting, except for Neuroticism where there seems to be no effect.

The results require very careful interpretation, because, as mentioned above, unexplained differences can also be caused by an under-specification of the model and in this specific case due to endogeneity of the treatment variable. This model suggests that, given the control variables included in the model, there is still a significant difference in all personality traits between children that experienced low supportive parenting and high supportive parenting. However, when the supportive parenting is confounded with the variables in the model, in a sense of control variables preceding the treatment variable, the remaining effect cannot be directly attributed to the treatment variable. This, for example could be the case with supportive parenting and education. Still, statements that can be made regarding to the explained effects. They still show the change in difference if the distribution of these variables would change.

Table 6.1: Correlation between parents' and children's personality traits

	Parents	Mothers		Fathers	
	Children	Daughters	Sons	Daughters	Sons
Openness	0.17***	0.19***	0.16***	0.17***	0.12***
Conscientiousness	0.18***	0.14***	0.14***	0.16***	0.17***
Extraversion	0.18***	0.12***	0.14***	0.16***	0.15***
Agreeableness	0.17***	0.18***	0.18***	0.14***	0.11***
Neuroticism	0.12***	0.20***	0.06*	0.08*	−0.01
Locus of Control	0.18***	0.18***	0.14***	0.14***	0.18***

GSOEP matched main and Youth Questionnaire

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6.2: One-tailed t-tests for differences between dhildren experiencing low and high supportive parenting

	Low supportive parenting			High supportive parenting			Mean difference	
	Obs	Mean	Std. Err.	Obs	Mean	Std. Err.	t	$p < \|t\|$
Openness	407	5.77	0.09	507	6.45	0.08	−5.48	0.00
Conscientiousness	407	6.08	0.09	507	6.76	0.08	−5.55	0.00
Extraversion	407	6.25	0.10	507	6.79	0.09	−3.88	0.00
Agreeableness	407	6.81	0.08	507	7.56	0.07	−7.17	0.00
Neuroticism	407	5.02	0.09	507	4.70	0.09	2.54	0.01
Locus of Control	1899	6.19	0.04	976	6.71	0.04	−9.51	0.00

GSOEP matched main and Youth Questionnaire

Table 6.3: Blinder-Oaxaca-Decomposition analysis for differences in personality traits by low and high supportive parenting

	(1) Locus of Control	(2) Openness	(3) Conscientiousness	(4) Extraversion	(5) Agreeableness	(6) Neuroticism
Differentials						
Low supportive parenting	5.95***	6.11***	6.12***	6.80***	5.06***	6.23***
	(0.15)	(0.16)	(0.18)	(0.15)	(0.17)	(0.08)
High supportive parenting	6.56***	6.78***	6.67***	7.50***	4.76***	6.71***
	(0.11)	(0.10)	(0.13)	(0.09)	(0.12)	(0.05)
Difference	−0.61***	−0.66***	−0.55**	−0.70***	0.30	−0.49***
	(0.19)	(0.19)	(0.22)	(0.17)	(0.21)	(0.09)
Explained						
Individual characteristics	−0.12**	−0.02	−0.02	−0.04	−0.01	0.01
	(0.06)	(0.05)	(0.04)	(0.04)	(0.05)	(0.03)
Socio-economic background	−0.00	0.04	−0.01	0.04	0.04	0.00
	(0.04)	(0.04)	(0.05)	(0.04)	(0.05)	(0.02)
Personality parents	−0.04	−0.10**	−0.03	−0.05	0.06	−0.04*
	(0.06)	(0.05)	(0.06)	(0.05)	(0.05)	(0.02)
Total	−0.16**	−0.08	−0.07	−0.05	0.09	−0.03
	(0.08)	(0.07)	(0.08)	(0.06)	(0.07)	(0.03)

Table 6.3 continued

	(1) Locus of Control	(2) Openness	(3) Conscientiousness	(4) Extraversion	(5) Agreeableness	(6) Neuroticism
Unexplained						
Total	−0.45**	−0.58***	−0.49**	−0.65***	0.21	−0.46***
	(0.18)	(0.18)	(0.21)	(0.16)	(0.20)	(0.08)
N	399	399	399	399	399	716

GSOEP matched main and Youth Questionnaire

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

'Personality characteristics' includes ender, year of birth, type of school

'Socio-economic status' includes years of education of the father and mother, EGP of father and mother, monthly household net income

'Personality parents' includes Openness to Experience, Conscientiousness, Extraversion, Agreeableness, Neuroticism, Locus of Control, each for father and mother

So far, results indicate a significant effect between parental personality and children's personality. It was also shown that the amount of supportive parenting makes a difference in the development of personality. As a last analysis for this chapter, the extent to which socialisation is able to explain the transfer of parents' personality to children's personality is examined (H3).

The results of the mediation analysis are presented in table 6.4. Looking at the total effects, the effects of all personality traits from parents to children are significant at a 5%-level, except for Neuroticism, which is only significant at a 10%-level. The direct effect presents the effect of parental personality traits on children's personality traits when adding supportive parenting to the equation. All of the coefficients are smaller than the ones from their total effects. However, all of them are still significant, again, excluding Neuroticism, which means that there is no a full mediation. Instead, there is only a so called partial mediation if the personality traits have a significant indirect effect even though the total effect is not reduced to 0. This is also the case for Extraversion and Neuroticism, however on a higher significance level (10% vs 1%). To facilitate the interpretation of the amount of mediation, table 6.5 shows the proportion of the total effect mediated. For Locus of Control, Conscientiousness and Agreeableness socialisation explains over 10% of the total effect. For Openness for Experiences it is still more than 7%.

6.4 Summary – A Healthy Personality Through Caring Parents

This chapter has examined the transmission of personality traits from parents to their children and used socialisation as a mechanism for this transmission. It was shown that parental personality and children's personality are correlated, which implies that personality is somehow transferred from the parents to the children. Therefore, personality is a possible candidate for functioning as a mediator of the effect of parental on children's educational attainment. While there seems to be no systematic difference in the trans-

Table 6.4: Mediation by supportive parenting on the effect of parental personality traits on children's personality traits

	Coef.	Std.Err.	p>|z|
Locus of Control			
Total effect	0.19	0.04	0.00
Direct effect	0.16	0.03	0.00
Indirect effect	0.02	0.01	0.00
Openness for Experiences			
Total effect	0.28	0.05	0.00
Direct effect	0.26	0.05	0.00
Indirect effect	0.02	0.01	0.00
Conscientiousness			
Total effect	0.42	0.08	0.00
Direct effect	0.37	0.08	0.00
Indirect effect	0.05	0.01	0.00
Extraversion			
Total effect	0.39	0.06	0.00
Direct effect	0.38	0.06	0.00
Indirect effect	0.01	0.01	0.04
Agreeableness			
Total effect	0.25	0.06	0.00
Direct effect	0.22	0.06	0.00
Indirect effect	0.03	0.01	0.00
Neuroticism			
Total effect	0.2	0.07	0.01
Direct effect	0.18	0.07	0.01
Indirect effect	0.01	0.01	0.03

GSOEP matched main and Youth Questionnaire

Weighted data

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6.5: Percentage of the effect of parental personality traits on children's personality traits mediated by supportive parenting

Personality traits	Percentage of mediated effect
Locus of Control	13.24%
Openness for Experiences	7.38%
Conscientiousness	11.94%
Extraversion	3.45%
Agreeableness	13.46%
Neuroticism	7.40%

GSOEP matched main and Youth Questionnaire
Weighted data
Calculations based on table 6.4

fer process of personality traits with regard to gender, Neuroticism forms an exception: Neuroticism, the degree of emotional stability, is only correlated between mothers and daughters. Male family members do not show systematic correlations neither among each other, nor in combination with a female family member. The correlation between mothers and daughters is so strong that even the overall effect, including men and sons, becomes significant.

The analysis also underlines the idea that socialisation, measured by supportive parenting, influences the development of personality. Based on these results, it is likely that socialisation is a relevant dimension in the reproduction of educational inequality. The results, however, need to be interpreted with care. As mentioned above, these models have a major downside, i.e. the gap in information about supportive parenting. The question of causal direction of supportive parenting with the other dependent and independent variables remains open. The process of self-selection into high and low supportive parenting cannot be shown easily, especially when there is no information on changes over time. In the worst case, the effects of supportive parenting and the character of the child have exactly the opposite causal direction than assumed, e.g. when the degree of supportive parenting depends on how emotionally stable a child is.

Another method that could be applied in the future is a propensity score matching. It has the same problem as the Blinder-Oaxaca-decomposition in terms of the endogenous

treatment variable, however, the model would indicate it, if the treatment groups were so systematically different, that a counterfactual analysis would not make sense at all. Still one should not be too pessimistic about the findings of this chapter. It consists of several analyses pointing towards the same direction. Whether or not other variables determine supportive parenting, it is certainly clear that there is a direct relationship between supportive parenting and the personality traits of the children.

What implications do these results have for practical application? Current attempts to address learning outcomes in the educational field have mostly addressed the fostering of cognitive abilities. However, this is not satisfactory to explain the lack of educational success in children's families. Whereas the welfare state has neither the possibilities nor the rights to intervene in the socialisation processes of families, it could improve proactive measures to support parents in need. This includes further offers of parenting courses and the availability of social workers visiting families. A mere increase in quantity will, however, not be enough. As the latest research has demonstrated (Blossfeld et al. 2017a), it is not quantity that improves educational outcome but rather the quality of care-taking. Rather than investing in a higher number of educational staff, such as social workers, kindergarten teachers or school teachers, investments into the quality of their education will more likely to improve children's paths into adulthood. An incentive system, motivating educational staff into lifelong-learning activities, might be more useful than quantitative aspects.

Furthermore, a de-stigmatisation of state interventions is necessary. So far, only the most highly socially vulnerable families, e.g. disadvantaged single mothers, receive state support in the form of non-financial services. Any state intervention into education within families is usually stigmatised as intervention for families labelled as 'not normal' or 'dysfunctional'. Self-initiated participation into optional counselling remains highly selective. More proactive interventions mean the institutionalisation of counselling offers for all, motivating parents to participate as a standard activity for the good of their children. By institutionalising such offers for everybody, parents might not perceive state offers in educational abilities as an intervention into their private sphere, but as a free-of-

cost service offer for themselves and their children. Aspects of educational interventions for parents may include advice on supportive parenting and activities, such as reading to children, and information on how these activities can contribute to a healthy development of the child. It is crucial to inform parents not only how to do these things but also why they are important, to move short- and long-term benefits into the focus of action.

Pre-school and school education should not be limited to foster cognitive abilities, such as additional classes or homework supervision, but also address the development of noncognitive skills. Activities strengthening children's personality development such as sports, crafts or group activities without grading, but with intense supervision by well-trained staff motivates children to develop a natural curiosity (Openness for Experience) and receiving rewards and recognition for controlled and thoughtful actions to achieve a goal (Conscientiousness), and developing social skills like collaboration (Agreeableness). Furthermore, such interventions can give children a higher feeling of control, by experiencing the consequences of their actions (Locus of Control). All of these factors can help to prevent emotional insecurity (Neuroticism) by helping children to develop a healthy relationship with their environment and with themselves.

In setting high goals from extra-curricular activities and parent counselling, it cannot be emphasised enough how important the quality of staff is. The mere participation in activities and interventions does not close the gap between high and low performing children and even more important, in a mentally healthy development. On the contrary, self-selection into these helpful activities can even increase the gap, by already advantaged children participating more and gaining more than disadvantaged children. Interventions need to target specific educational goals, teaching abilities that are helpful for parents and children.

7 Personality and Inequality – A Critical Discussion

7.1 Summary of the Key Findings

This thesis aimed to examine the role of personality in the context of intergenerational reproduction of inequality, especially educational and labour market outcomes, through three main research questions. The first research question examined the influence of personality on educational and labour market outcomes. The second research question examined to what extent differences in the personalities of children and parents explain the reproduction of education inequality within educational backgrounds over two generations. The third research question investigated to what extent educational inequality is influenced by supportive parenting, as well as the influence of supportive parenting on the development of favourable or unfavourable personality traits.

The first research question in section 4.5 addressed the direct effects of personality on children's educational and labour market outcomes. The structural equation models revealed a good fit of items for the latent variables. As expected, the effects of personality were rather small compared to the variation in the data, but significant effects were nonetheless found. The cross-lagged auto-regressive structural equation model revealed the complexity of the relationship between personality variables and income. It modelled reciprocal effects in a time order, increasing the likelihood of a claim for causality. However, as always when using possibly endogenous variables and a pseudo-experimental design, claiming causality is bold. What was made visible are the reciprocal effects be-

tween two variables over a longer time span. These effects could be rooted in previous developments earlier in the life course or influenced by external variables.

To tackle this problem, it would be ideal to have panel data that tracks young people from early age to later stages of the life course. The Youth questionnaire has a very high drop-out rate, about 90%, which is one of the reasons why researchers have yet to exploit the potential of the Youth questionnaire. There are already longer running studies including young people in other areas of inequality research regarding education and later outcomes. Prime examples are the three cohort studies of the British Centre for Longitudinal Studies, the 1958 National Child Development Study, the 1970 British Cohort Study and the Millennium Cohort Study. However, none of these containing major information about personality or bi-generational information. A later example is the National Educational Panel Study (NEPS) which carries much hope for education and inequality researchers in the future, due to its rich information on the early development of abilities and educational careers, as well as comprehensive information about the parents. So far, personality has been included in the parental data set, but not for the younger cohorts. It is a major challenge to find comparable measures of personality that apply to very young children, like toddlers and pre-school children, and are comparable to parental personality.

Personality showed about as much change over time as income did in the models. While the effects are modest, they are clearly there. So far, most researchers tended to interpret small changes as stability (Caspi et al., 2005; Costa et al., 2000; Costa and McCrae, 1994; Roberts and Jackson, 2008; Roberts et al., 2008). However, it might be worth reconsidering this. If income is commonly used as time-variant variable and personality shows a similar amount of variability over time, why would personality then be considered as 'stable'? A reconsideration might also open the door for more research on factors influencing personality in adults as well as early development.

Future research will benefit from recently started panel data with children. The effects of personality on educational outcomes could then be addressed in more detail. This study showed reciprocal effects with income for most of the personality traits. These

types of models can be extended to life events and external shocks. Generally, more complex relationships between socio-economic factors and personality can be modelled. Even a life course approach combining several life stages could be taken into consideration. Questions of stability and malleability could be assessed in detail, including reciprocal effects of previous life events.

This makes a very strong point towards more panel data of higher quality. The emphasis lies on the inclusion of high quality measurements of personality traits over the whole life course. This comes at the cost of rather long questionnaires, but when comparing, for example, the original questionnaire of Locus of Control (table 2.2) and the short version that was implemented in the GSOEP (table 3.5) it is obvious how much the short version is missing. When designing questionnaires of collection data, the balance between the quantity and quality of the data and the willingness and availability of participating individuals is a challenging endeavour.

The second research question in chapter 5 asked how educational outcomes are transferred from one generation to another as well as to what extent does personality explain this difference. It was tested whether the personality of either the parents or the children can mediate the very robust effect of parental education on children's school and outcomes. There was no evidence for personality as a mediator. There were hardly any effects from socio-economic background variables on maths grades. One reason for the few significant effects in general is the low case number, especially among those in lower secondary school. But as argued in the chapter, socio-economic background might not be as important for school performance as for transitions and the attainment of degrees.

While the education of the father exclusively dominated the academic achievement and income of the older sample, in the younger sample mothers' education had the same impact on early educational outcomes as fathers'. For the question of whether personality has a mediating effect on this relationship, the answer is clearly no. The effect of parents' education on children's school outcomes is very stable, even when controlling for socio-economic status and income – a non-hypothesised finding.

Personality, namely the Openness to Experience of the mother and the child, the Agree-

ableness of the mother and the Locus of Control of the father and of the child, showed significant effects on school outcomes. The personality traits of parents could not mediate the effect of parental education on children's school placement. Also, the income effect was mostly unaffected by personality. However, personality did change effects in the EGP, and only under control of personality traits, boys turned out to be more likely to attend lower secondary instead of intermediate secondary. There is a chance that selected personality traits have a mediating effect on socio-economic background and school outcomes but not directly on any aspect of socio-economic background. Further research could be dedicated to identify the socio-economic factors that are and are not influenced by personality traits.

Chapter 6 was dedicated to the third research question on how children are similar to their parents in personality and how socialisation, using parenting style as a proxy, contributes to the development of favourable character traits. I found that children resemble parents in their personality. Correlations were shown to be rather small, but significant. The size of the correlation coefficient does not tell anything about the importance or substantial meaning of the relationship between two variables. Considering personality variables functioning in very specific ways under specific circumstances, small effects cannot be ignored.

Personality traits are influenced positively by a supportive parenting style that comprises attentive care of the children, active inclusion into family decisions and showing love and compassion. Third variables such as education, socio-economic status and gender could not explain differences within personality traits as well as supportive parenting. The parenting style could explain more than 10% of the variation between the personality traits of parents and children. These results emphasise the importance of socialisation through parental care in personality development.

The measure for supportive parenting was not measured objectively as in the study of Schofield et al. (2012), but the perceived supportive parenting from the adolescents. This could lead to biased effects in this study, if supportive parenting and parts of the personality would capture the same latent construct.

There were further technical shortcomings in these studies. Some measures of cognitive performance, such as intelligence or test scores would have been of great help to understand the role of personality in social inequality. Cognitive abilities are the best predictors for school achievements and it would be interesting to see to what extent personality would still contribute as explanatory variable or if there are interrelations between cognitive abilities and personality on socio-economic outcomes. A combination of such measures would greatly contribute to research because as previous researchers, for example the frequently cited marshmallow study, which tested delayed gratification in children, that cognitive and noncognitive development are strongly connected (Mischel, 1973; Mischel and Shoda, 1985; Mischel et al., 1989).

7.2 Is It Possible to Bring Different Disciplines Together? - The Limits of Data and Theory

This thesis aimed to integrated psychological variables with sociological methods and models. There are some weaknesses of an interdisciplinary approach. Sociologists have a long-term outcome focused approached, looking at the total results of personality differences in socio-economic outcomes. This might have a higher relevance regarding policy making and educational approaches. However, the mechanisms of how personality effects educational success stays hidden due to the character of pseudo-experimental data. Psychologists have been stronger in explaining the effects and mechanisms of single personality traits on performance or other types of acting. Due to experimental research designs, they can take into consideration situational factors and can extract single effects with a stronger claim to causality than is possible in survey research.

It is difficult to find a perfect research design to combine both disciplines and to cover long-term outcomes and individual (situational) acting preferences at the same time. In experimental designs, real life situations and educational decisions cannot be simulated, let alone randomised. Situational acting preferences are difficult to capture in surveys on the other hand. If we would like to capture both socio-economic outcomes and causal

mechanisms in terms of personality, a special panel study would be necessary. In addition to asking for personality traits, the questionnaire needs to be supplemented with questions for decision preferences in imaginative or real situations, which could then be connected to personality differences and socio-economic outcomes. Obviously, the question of how to act in a hypothetical scenario causes some validity problems, but it would likely come as close as possible. When talking about causal effects and the analysis of secondary data, every researcher would prefer a panel design, optimally spanning the whole life course. Until this kind of data is available, it is necessary to think in small steps and try to assemble small pieces of research towards a more complete understanding of this matter.

A central shortcoming of this work was the absence of a general theory of personality and long-term school and labour market outcomes. One reason is the problem of generalising the effects of personality on long-term outcomes when personality affects only situational acting. Rotter (1990) states that personality traits, in the context of Locus of Control but also transferable to other traits, are rather difficult to generalise. However, the main interest in sociology are outcomes on a societal level that might be too broad and complex to be explained by generalised functions of personality traits. To develop such a theory, a careful investigation would need to be done coming from two directions, the small situational effects in which different personality types make different decisions as well as from a structural perspective in the context of social inequality. The aim would be to find the smallest common denominator on which a theory would be general enough to make predictions on long term outcomes, but precise enough to capture the complex and small personality effects.

Future research with personality does not have to be restricted to 'typically' sociological research questions and the Big Five and Locus of Control. Besides sociologists and psychologists, political scientists and behavioural economists have an interest in studying personality, for example in the context of voting behaviour or cooperation (e.g. Montgomery, 2016; Lozano, 2016). The American National Election Study, which is still in development, already includes measures for Need for Cognition. This shows that researchers do not always have to focus on the Big Five and Locus of Control. It is very

likely that the most influential personality traits on educational and labour market outcomes have not yet been found. An example that had a big impact in the media recently (Though, June; Duckworth, pril), is 'Grit', a personality measure 'capturing perseverance and passion towards long-time goals' (Duckworth et al., 2007, p.1). Grit was found to be highly correlated with Conscientiousness, educational attainment, and career stability (Duckworth and Quinn, 2009; Duckworth et al., 2007). However, one study pointed out that in their study, grit does not provide a great surplus to the already established personality measures Big Five and Locus of Control (Dumfart and Neubauer, 2016) and the effects of grit in the studies of Duckworth and Quinn (2009) and Duckworth at al. (2007) is the result of sample selection due to a limited range of schools under research. The author additionally finds that alternative measures such as self-discipline, self-efficacy, which is closely related to Locus of Control, as well as test anxiety, rate similarly low in explanatory power for predicting school achievement. Other research includes grit into the same domain as Conscientiousness, to be more precise, it describes grit as a '[...] lower-level personality trait in the domain of Conscientiousness' (Ivcevic and Brackett, 2014, p. 29). In general, one major shortcoming of the Big Five is the lack of theoretical and biological foundation as well as the missing link to motivation.

In the context of neighbourhood effects and educational attainment Nieuwenhuis et al. (2015) pointed out a similar effect for personality measures in their field of research:

> Studies on personality often distinguish three personality types: resilients, undercontrollers, and overcontrollers, which relate closely to the five broad personality dimensions of the Big Five (Caspi et al., 2005): extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience (McCrae and Costa, 1987). Earlier research has consistently shown that the personality types have specific Big Five personality profiles, and can therefore be constructed directly from the Big Five personality dimensions (Klimstra et al., 2010; Mervielde and Asendorpf, 2000; Robins et al., 1996) . (p. 101)

Changing (in the example of Locus of Control) the number of variables from 8 to 28 is

almost impossible to implement in such a large-scale survey as the GSOEP, that focuses on socio-economic aspects. In addition to the SOEP, Germany sociologists have set up a panel about education, the National Educational Panel Study (NEPS), a panel study about relationships and family, the Panel Analysis of Intimate Relationships and Family Dynamics (pairfam), just to name a few. However, to my knowledge, there is no longer-running panel study concentrating on personality, personality development over the life course, not to mention information on two generations, peers, and socio-economic as well as demographic information.

Little is known about the distribution of personality traits in the population apart from the Big Five and Locus of Control due to the limited availability of large-scale experiments or surveys. However, research is progressing: The GSOEP continues to include personality measures in the near future. The NEPS has started to introduce personality measures of the parents, mainly the mother, and tracks young children, trying to capture personal development. At this early stage, it is difficult to say in how far similarities between parents and children can be captured due to differences in measurements.

I suggest for further research to focus on decisional situations such as transitions into tracks or in continuing education. It would be interesting to analyse how decisions differ by personality under differences in selection criteria, e.g. in school systems where transitions depend on grades, on teachers' recommendations, or where the transition into and out of further education depends on the parents. Especially interesting would be a transition that the student themselves has a greater amount of control over, namely the transition to tertiary education.

7.3 Research Outlook

Regarding data analysis about this topic in future research, I would like to go beyond linear effects by modelling more complex relations between personality and outcome variables. This could be interactions such as changes in effects by age or over time, modelling non-linear effects using polynomials, or construing personality measures into categorical

variables, instead of assuming it to be ordinal or metric.

Another possible research question is if personality has different impacts on education and labour market outcomes at different stages of the life course. However, as mentioned above, very rich and longitudinal data on personality and the history of the educational and labour market experience of individuals is necessary to be able to complete these analyses.

The latest research (Blossfeld et al., 2017a) has shown that children from disadvantaged backgrounds keep up with their peers better when spending more time in high quality pre-school facilities with well qualified staff and with children of more advantaged backgrounds. It is tempting to conclude that it is better for disadvantaged children to spend more time away from their parents and to leave their socialisation and teaching outside school to professionals who do it 'better'. The inference behind this idea is based on the assumption of an inability of parents with a lower-class background to nurture their children appropriately. Even more, it assumes lower class families to be dysfunctional.

I oppose the idea that parents are not able to adequately prepare their children for school. Because the main focus of sociological research has concentrated on cognitive abilities, or even simply on socio-economic background and school outcomes without examining educational processes outside school. A classic example is when children address teachers using the casual 'Du-form' instead of the polite 'Sie-Form' as it is conventional in Germany. It is unlikely that parents, even those with a low level of education, do not know this convention. Even with a migration background and little knowledge of the German language, knowing how to greet and address people properly is one of the first things to be learned. It is much more likely that this is down to parents not putting an emphasis on actively transferring their knowledge.

For a very long time sociological research has neglected other individual attributes that compensate for or lead to cognitive disadvantages, e.g. knowledge of how to solve conflicts among classmates, of how to behave in the classroom, or of how to deal with poor success in educational performance. These abilities might not make the difference between a very gifted or a disadvantaged child, but it might tip the scales when it comes

to the choice between two school tracks, or whether to drop out of the educational system. Considering these research results, policy intervention should not only aim directly on improving school outcomes, but on more integrated child development, as cognitive and noncognitive development goes hand in hand.

Future research could also use more frequently new research design and mixed methods approaches. This could uncover, to what extent persons act according to their personality and how this influences their life decision. Qualitative interviews would greatly contribute to this field of research. A study with an alternative research design in the direction of researching processes of transfer of educational inequality is currently conducted by Barone, Fougere and van Zanten (2016) and Barone (2016) and their project 'Fostering the Language Skills of Children from Low-educated Families: An Ex-Ante Experimental Evaluation of A Parental Reading Initiative'. The researchers use qualitative and quantitative methods to obtain knowledge about the attitude towards, knowledge and practice of reading to children to improve their reading skills. Furthermore, the project includes an initiative targeting parents and children of low socio-economic status by giving parents information about the importance and advantages of reading to children, giving them free books, and sending them weekly messages with reminders and helpful tips regarding reading. These kinds of experimental studies been conducted in the US as well as France, and have given indications that the attitudes, rather than cognitive abilities of parents make the differences in the success of educational interventions. A study conducted by Mayer et al. (2015) in Chicago revealed presence-orientation as an important attitude by parents. Presence orientation (Thaler, 2015) is a thinking bias, which expresses the tendency of primarily satisfying present needs or thinking about long term consequences. A classic example is saving money. More present-oriented persons tend to spend their money quickly and tend to save less for the future (Thaler and Bernartzi, 2004). The study of Mayer et al. (2015) reveals that motivation in parental involvement shows similar mechanisms: The educational intervention was particularly efficient with those parents who had a strong tendency to present-orientation and that managing social-psychological factors, in this case goal-setting and social rewards, could help parents to support their

children in education.

A general lesson learned is the existence of noncognitive attributes of the parents other than the Big Five and Locus of Control that influence children's success. Other than the present-orientation bias in the study of Mayer et al. (2015), Haimovitz and Dweck (2016) find parental 'failure mind-set', the belief of how failure motivates or de-motivates further learning, shows a significant effect on the educational failure of children in an experimental setting.

The alternative personality measures mentioned above have been shown to have direct effects from parents to children's educational outcomes in experimental settings in the US context. However, there is, unlike the Big Five and Locus of Control, little evidence in large scale studies of inter-cultural replication. To my knowledge there is no study that provides first-hand information of these traits in parents and children, which makes it impossible to consider whether there is a direct effect of parental personality traits on children's educational outcomes or whether it is an indirect effect. In this context, an indirect effect means that parents transfer their personality traits which positively influence educational and labour market outcomes to their children and that these transferred personality traits directly transfer the outcomes.

Extending this type of research intervention and combining multiple disciplines could also be a way of tackling parenting skills leading to healthy personality development in children. The Montessori philosophy of education is built on the assumption that children will grow to their full potential by themselves and on their own motivation, provided that parents and educators create a fruitful environment in which the child can flourish. To say it in the words of Maria Montessori: 'To assist a child we must provide him with an environment which will enable him to develop freely.' In the right environment, children will develop a healthy personality and other noncognitive skills themselves, which eventually leads to fulfilled individuals that contribute to the greater good for society.

Personality is the way our acting and decision preferences are set. The unique mind-set it gives to any individual must be considered to influence educational decisions and career

choices. Rather than to set the topic aside because of small effects in multivariate models from survey data, it should be asked: How can we appropriately capture differences in personality traits? What are the best methods of analysing small effects in complex contexts, and how is it possible to discover causal mechanisms, rather than effects between two variables? Finally, when asking these questions, we should bear in mind, that we not only want to reduce inequality, but also to foster diversity.

References

Adler, N. E., Boyce, T., Chesney, M. A., Cohen, S., Folkman, S., Kahn, R. L., & Syme, S. L. (1994). Socioeconomic status and health: The challenge of the gradient. *American Psychologist*, 49(1), 15–24.

Alloy, L. B. & Abramson, L. Y. (1982). Learned helplessness, depression, and the illusion of control. *Journal of Personality and Social Psychology*, 42(6), 1114–1126.

Almlund, M., Duckworth, A. L., Heckman, J. J., & Kautz, T. D. (2011). *Personality psychology and economics*. Technical report, National Bureau of Economic Research.

Amato, P. R. (1990). Dimensions of the family environment as perceived by children: A multidimensional scaling analysis. *Journal of Marriage and Family*, 52(3), 613–620.

Anthony, W. (1973). The development of extraversion, of ability, and of the relation between them. *British Journal of Educational Psychology*, 43(3), 223–227.

Baron, R. & Kenny, D. (1986). Moderator-mediator variables distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173–1182.

Barone, C. (2006). Cultural capital, ambition and the explanation of inequalities in learning outcomes: A comparative analysis. *Sociology*, 40(6), 1039–1058.

Barone, C. (2016). Fostering the language skills of children from low-educated families. Project application of the Laboratoire Interdisciplinaire D'évaluation de Politique Publique, Sciences Po and the Université Sorbonne.

Barone, C., Fougère, D., Van Zanten, A., & Pin, C. (2016). Fostering the language skills of children from low-educated families. Study protocol of the Laboratoire Interdisciplinaire D'évaluation de Politique Publique, Sciences Po and the Université Sorbonne.

Barrick, M. R. & Mount, M. K. (1991). The Big Five personality dimensions and job performance: A meta-analysis. *Personel Psychology*, 44(1), 1–26.

Beck, A. T., Brown, G., Epstein, N., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology*, 56(6), 893–897.

Beck, A. T., Ward, C., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, 4(6), 561–571.

Becker, G. S. (1964). *Human capital*. National Bureau of Economic Research.

Bernardi, F. (2012). Unequal transitions: Selection bias and the compensatory effect of social background in educational careers. *Research in Social Stratification and Mobility*, 30(2), 159–174.

Bianchi, S. (2006). Mothers and daughters 'do', fathers 'don't do' family: Gender and generational bonds. *Journal of Marriage and Family*, 68(4), 812–816.

Blanden, J., Gregg, P., & Macmillan, L. (2007). Accounting for intergenerational income persistence: Noncognitive skills, ability and education. *The Economic Journal*, 117, 43–60.

Blau, F. D. & Kahn, L. M. (1997). Swimming upstream: Trends in the gender wage differential in the 1980s. *Journal of Labor Economics*, 15(1, Part 1), 1–42.

Blau, F. D. & Kahn, L. M. (2016). The gender wage gap: Extent, trends, and explanations. *IZA Discussion Papers No. 9656*.

Blickle, G. (1996). Personality traits, learning strategies and performance. *European Journal of Personality*, 10, 337–352.

Blinder, A. (1973). Wage discrimination: Reduced form and structural estimates. *Journal of Human Resources*, 8(4), 436–455.

Blossfeld, H.-P. (1993). Changes in educational opportunities in the Federal Republic of Germany: a longitudinal study of cohorts born between 1916 and 1965. In Y. Shavit & H.-P. Blossfeld (Eds.), *Persistent Inequalitites: Changing Educational Attainment in Thirteen Countries* (pp. 51–74). Boulder, CO: Westview Press.

Blossfeld, H.-P. (2009). Educational assortative marriage in comparative perspective. *Annual Review of Sociology*, 35(1), 513–530.

Blossfeld, H.-P. & Drobnic, S. (2001). *Careers of Couples in Contemporary Society: From Male Breadwinner to Dual-Earner Families*. Oxford: OUP.

Blossfeld, H.-P., Kulic, N., Skopek, J., & Triventi, M. (2017a). *Childcare, Early Education and Social Inequality – An International Perspective*. eduLIFE Lifelong Learning Series. Vol. 4. Cheltenham, UK: Edward Elgar.

Blossfeld, H.-P., Kulic, N., Skopek, J., & Triventi, M. (2017b). *Models of Secondary Education and Social Inequality*. eduLIFE Lifelong Learning Series. Vol. 3. Cheltenham, UK: Edward Elgar.

Blossfeld, H.-P. & Timms, A. (2003). *Who Marries Whom? Educational Systems as Marriage Markets*. The Hague: Kluwer Academic Publishers.

Boekaerts, M. (1996). Personality and the psychology of learning. *European Journal of Personality*, 10, 377–404.

Borghans, L., Duckworth, A. L., Heckman, J. J., & Ter Weel, B. (2008a). The economics and psychology of personality traits. *IZA Discussion Paper No. 3333*, Institute for the Study of Labor, 1–164.

Borghans, L., Meijers, H., & Ter Weel, B. (2008b). The role of noncognitive skills in explaining cognitive test scores. *Economic Inquiry*, 46, 2–12.

Boudon, R. (1974). *Education, Opportunity, & Social Inequality. Changing Prospects in Western Society.* New York: Wiley & Sons.

Bourdieu, P. (1986). The forms of capital. In J. Richardson (Ed.), *Handbook of Theory and Research for the Sociology of Education* (pp. 241–258). New York: Greenwood.

Bourdieu, P. & Passeron, J. C. (1977). *Reproduction in Education, Society and Culture.* London: SAGE.

Bowles, H. R., Babcock, L., & McGinn, K. (2005). Constraints and triggers: situational mechanics of gender in negotiation. *Journal of personality and social psychology*, 89(6), 951.

Bowles, S. & Gintis, H. (1976). *Schooling in Capitalist America.* New York: Basic Books.

Bowles, S., Gintis, H., & Osborne, M. (2001). The determinants of earnings: A behavioral approach. *Journal of Economic Literature*, 39(4), 1137–1176.

Breen, R., Karlson, K., & Holm, A. (2013). Total, direct, and indirect effects in logit and probit models. *Sociological Methods & Research*, 42(2), 164–191.

Breen, R., Luijkx, R., Mueller, W., & Pollak, R. (2009). Nonpersistent inequality in educational attainment: Evidence from eight European countries. *American Journal of Sociology*, 114(114), 1475–1521.

Brunello, G. & Schlotter, M. (2011). Noncognitive skills and personality traits: Labour market relevance and their development in education & training systems. *IZA Discussion Paper No. 5743*, Institute for the Study of Labor, 1–45.

Buchholz, S., Skopek, J., Zielonka, M., Ditton, H., Wohlkinger, F., & Schier, A. (2017). Secondary school differentiation and inequality of educational opportunity in Germany. In H.-P. Blossfeld, S. Buchholz, J. Skopek, & M. Triventi (Eds.), *Models of Secondary Education and Social Inequality* (pp. 79–92). Cheltenham, UK: Edward Elgar.

Buchmann, C., DiPrete, T., & McDaniel, A. (2008). Gender inequalities in education. *Annual Review of Sociology*, 34, 319–337.

Budig, M. J. & England, P. (2001). The wage penalty for motherhood. *American Sociological Review*, 66(2), 204–225.

Busato, V. V., Prins, F. J., Elshout, J. J., & Hamaker, C. (1998). The relation between learning styles, the big five personality traits and achievement motivation in higher education. *Personality and Individual Differences*, 26(1), 129–140.

Carneiro, P. & Heckman, J. J. (2003). Human capital policy. *IZA Discussion Paper No. 821*, Institute for the Study of Labor, 1–150.

Caspi, A. & Roberts, B. W. (1999). Personality continuity and change across the life course. In L. A. Pervin & O. John (Eds.), *Handbook of Personality: Theory and Research* (pp. 300–326). New York: Guilford.

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annual Review of Psychology*, 56, 453–484.

Chamorro-Premuzic, T. & Furnham, A. (2003). Personality predicts academic performance: Evidence from two longitudinal university samples. *Journal of Research in Personality*, 37(4), 319–338.

Cipollone, A., Patacchini, E., & Vallanti, G. (2014). Female labour market participation in europe: Novel evidence on trends and shaping factors. *Journal of European Labor Studies*, 3(18), 1–40.

Cobb-Clark, D. A. (2014). Locus of control and the labor market. *Journal of Labor Economics*, 4(3), 1–19.

Cobb-Clark, D. A. & Tan, M. (2011). Noncognitive skills, occupational attainment, and relative wage. *Labour Economics*, 18, 1–13.

Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, F., Mood, A. M., & Weinfeld, F. D. (1966). *Equality of Educational Opportunity.* Washington, DC: United States Office of Education, U.S. Government Printing Office.

Conard, M. A. (2006). Aptitude is not enough: How personality and behavior predict academic performance. *Journal of Research in Personality*, 40(3), 339–346.

Costa, P. & McCrae, R. R. (1985). *The NEO Personality Inventory Manual.* Odessa, FL: Psychological Assessment Resources.

Costa, P. T. & McCrae, R. R. (1988). Personality in adulthood: A six-year longitudinal study of self-reports and spouse ratings on the NEO Personality Inventory. *Journal of Personality and Social Psychology*, 54(5), 853–863.

Costa, P. T. & McCrae, R. R. (1994). Set like plaster: Evidence of the stability of adult personality. In T. F. Heatherton & J. L. Weinberger (Eds.), *Can Personality Change?* (pp. 21–40). Washington, DC: American Psychological Association.

Costa, P. Z., Herbst, J. H., McCrae, R. R., & Siegler, I. C. (2000). Personality at midlife: Stability, intrinsic maturation, and response to life events. *Assessment*, 7(4), 365–378.

Costello, A. B. & Osborne, J. (2005). Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *Practical Assessment Research & Evaluation*, 10(7), 1–9.

Cunha, F. & Heckman, J. J. (2008). Formulating, identifying and estimating the technology of cognitive and noncognitive skill formation. *The Journal of Human Resources*, 43(4), 738–782.

Damian, R. I., Su, R., Shanahan, M., Trautwein, U., & Roberts, B. W. (2015). Can personality traits and intelligence compensate for background disadvantage? predicting status attainment in adulthood. *Journal of Personality and Social Psychology*, 109(3), 473–489.

De Fruyt, F. & Mervielde, I. (1996). Personality and interests as predictors of educational streaming and achievement. *European Journal of Personality*, 10, 405–425.

DeRaad, B. & Schouwenburg, H. C. (1996). Personality in learning and education: A review. *European Journal of Personality*, 10, 303–336.

Desoete, A. & Roeyers, H. (2005). Cognitive skills in mathematical problem solving in grade 3. *British Journal of Educational Psychology*, 75(1), 119–138.

Digman, J. M. (1990). Personality structure: Emergence of the Five-Factor Model. *Annual Review of Psychology*, 41, 417–440.

DiPrete, T. & Jennings, J. L. (2012). Social/behavioral skills and the gender gap in early educational achievement. *Social Science Research*, 41(1), 1–14.

DiPrete, T. A. & Buchmann, C. (2013). *The Rise of Women: The Growing Gender Gap in Education and What It Means for American Schools*. New York: Russell Sage Foundation.

Dollinger, S. & Orf, L. (1991). Personality and performance in 'personality': Conscientiousness and openness. *Journal of Research in Personality*, 25(3), 276–284.

Duckworth, A. L. (2013, April). *Grit: The power of passion and perseverance [Video file]*. Retrieved from https://www.ted.com/talks/angela_lee_duckworth_grit_the_power_of_passion_and_perseverance.

Duckworth, A. L., Peterson, C., Matthews, M., & Kelly, D. (2007). Grit: Perseverance and passion for long-term goals. 92, 1087–1101.

Duckworth, A. L. & Quinn, P. (2009). Development and validation of the Short Grit Scale (Grit-S). *Journal of Personality Assessment*, 91(2), 166–174.

Dumfart, B. & Neubauer, A. C. (2016). Conscientiousness is the most powful noncognitive predictor of school achievement in adolescents. *Journal of Individual Differences*, 37(1), 8–15.

Dupuy, A. & Galichon, A. (2014). Personality traits and the marriage market. *Journal of Political Economy*, 122(6), 1271–1319.

Dweck, C. S. (1999). *Self-Theories: Their Role in Motivation, Personality, and Develpement*. Lilington, NC: Psychology Press.

Dweck, C. S. (2008). Can personality be changed? The role of beliefs in personality and change. *Current Directions in Psychological Science*, 17, 391–394.

Dweck, C. S. & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, 95(2), 256–273.

Entwistle, N. (1988). Motivational factors in students' approaches to learning. In R. R. Schmeck (Ed.), *Learning Strategies and Learning Styles* (pp. 21–51). New York: Plenum Press.

Entwistle, N. & Cunningham, S. (1968). Neuroticism and school attainment - a linear relationship? *British Journal of Educational Psychology*, 38(2), 123–132.

Entwistle, N. J. & Entwistle, D. (1970). The relationships between personality, study methods and academic performance. *British Journal of Educational Psychology*, 40(2), 132–143.

Erikson, E. (1950). *Childhood and Society*. New York: Norton.

Erikson, R., Goldthorpe, J., Jackson, M., Yaish, M., & Cox, D., Eds. (2005). *On Class Differentials in Educational Attainment*. Proceedings of the National Academy of Sciences: 9730-9733.

Erikson, R. & Goldthorpe, J. H. (1992). *The Constant Flux. A Study of Class Mobility in Industrial Societies*. Oxford: Clarendon Press.

Esping-Andersen, G. (2009). *Incomplete Revolution: Adapting Welfare States to Women's New Roles.* Cambridge: Polity Press.

Farkas, G. (2003). Cognitive skills and noncognitive traits and behavior in stratifiacation processes. *Annual Sociological Review*, 29, 541–562.

Fietze, S., Holst, E., & Tobsch, V. (2009). Personality and career - She's got what it takes. *DIW Working Paper, Berlin*.

Finkel, S. E. (1995). *Causal Analysis With Panel Data. Quantitative Applications in the Social Sciences*, volume 7 of *Sage University Papers Series*. London: Sage.

Fletcher, J. M. (2012). The effects of personality traits on adult labor market outcomes: Evidence from siblings. *IZA Discussion Paper No. 6391*, Institute for the Study of Labor.

Flossman, A. L., Piatek, R., & Wichert, L. (2007, August). *Going beyond returns to education: The role of noncognitive skills on wages in Germany.* Budapest: Paper presented at the European Meeting of the Econometric Society.

Frick, J. R., Haisken-DeNew, J. P., Krause, P., Pischner, R., Schupp, J., & Spiess, K. (2005). Survey extensions. In J. P. Haisken-DeNew & J. R. Frick (Eds.), *Desktop Companion to the German Socio-Economic Panel (SOEP) - Updated to Wave 21* (pp. 61–84). Berlin: DIW.

Fuligni, A. J. (1997). The academic achievement of adolescents from immigrant families: The role of family background, attitudes, and behavior. *Child development*, 68(2), 351–363.

Furnham, A. & Chamorro-Premuzic, T. (2004). Personality and intelligence as predictors of statistics examination grades. *Personality and Individual Differences*, 37, 943–955.

Geary, D. (2011). Cognitive predictors of achievement growth in mathematics: A five year longitudinal study. *Developmental Psychology*, 47(6), 1539–1552.

Gerlitz, J.-Y. & Schupp, J. (2005). Zur Erhebung der Big-Five-basierten Persönlichkeitsmerkmale im SOEP. *DIW Research Notes*, 4.

Goldin, C., Katz, L., & Kuziemko, I. (2006). The homecoming of American college women: The reversal of the college gender gap. *Journal of Economic Perspectives*, 20(4), 133–156.

Gottschalk, P. (2005). Can work alter welfare recipients' beliefs? *Journal of Policy Analysis and Management*, 24, 485–498.

Gough, H. (1957). *Manual for the California Personality Inventory*. Paolo Alto: Consulting Psychologists Press.

Grabka, M. M. (2016). Soep 2014 codebook for the $pequiv file 1984-2014: cnef variables with extended income information for the SOEP. *SOEP Survey Papers*, 300, 1–205.

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360–1380.

Haendel, M., Artelt, C., & Weinert, S. (2013). Assessing metacognitive knowledge: Development and evaluation of a test instrument. *Journal for Educational Research Online*, 5(2), 162–188.

Haimovitz, K. & Dweck, C. S. (2016). Parent' views of failure predict children's fixed and growth intelligence mind-sets. *Psychological Science*, 27(6), 859–869.

Hamplova, D. (2009). Educational homogamy among married and unmarried couples in europe. *Journal of Family Issues*, 30(1), 28–52.

Hansemark, O. C. (1998). The effects of an entrepreneurship programme on need for achievement and locus of control of reinforcement. *International Journal of Entrepreneurial Behavior & Research*, 4(1), 28–50.

Hattie, J. (1992). Measuring the effects of schooling. *Australian Journal of Education*, 36(1), 5–13.

Heaven, P. C., Ciarrochi, J., & Vialle, W. (2007). Conscientiousness and Eysenckian psychoticism as predictors of school grades: A one-year longitudinal study. *Personality and Individual Differences*, 42(3), 535–546.

Heckman, J. J. (2008). *Noncognitive Skills: Acquisition and Economic Consequences*. Mannheim: Presentation at the Leibniz Network Conference.

Heckman, J. J., Moon, H. S., Pinto, R., Savelyev, P. A., & Yavitz, A. (2010). The rate of return to the HighScope Perry Preschool Program. *Journal of Public Economics*, 94, 114–128.

Heckman, J. J. & Mosso, S. (2014). The economics of human development and social mobility. *Annual Review of Economics*, 6, 689–733.

Heckman, J. J. & Rubinstein, Y. (2001). The importance of noncognitive skills: Lessons from the ged testing program. *The American Economic Review*, 91(2), 145–149.

Heineck, G. & Anger, S. (2010). The returns to cognitive abilities and personality traits in Germany. *Labour Economics*, 17(3), 535–546.

Helson, R., Mitchel, V., & Moane, G. (1984). Personality and patterns of adherence and nonadherence to the social clock. *Journal of Personality and Social Psychology*, 46, 1079–1096.

Hopwood, C. J., Donnellan, M. B., Bloningen, D. M., Krueger, R. F., MacGue, M., Iacono, W. G., & Burt, S. A. (2011). Genetic and environmental influences on personality trait stability and growth during the transition to adulthood: A three-wave longitudinal study. *Journal of Personality and Social Psychology*, 100(3), 545–556.

Hox, J. J. & Bechger, T. (1998). An introduction to structural equation modeling. *Family Science Review*, 11, 354–373.

Hynes, E. (1985). Social values and punishment behavior: An Irish test of Kohn's thesis. *Sociological Perspective*, 28(2), 217–239.

Ivcevic, Z. & Brackett, M. (2014). Predicting school success: Comparing Conscientiousness, Grit and Emotion Regulation Ability. *Journal of Research in Personality*, 52, 29–36.

Jackson, M. (2006). Personality traits and occupational attainment. *European Sociological Review*, 22(2), 187–199.

Jackson, M., Erikson, R., Goldthorpe, J., & Yaish, M. (2007). Primary and secondary effects in class differentials in educational attainment. The transition to A-Level courses in England and Wales. *Acta Sociologica*, 50(3), 211–229.

Jacob, B. A. (2002). Where the boys aren't: Non-cognitive skills, returns to school and the gender gap in higher education. *NBER Working Paper 8964*, National Bureau of Economic Research.

Jann, B. (2008). The Blinder-Oaxaca decomposition for linear regression models. *The Stata Journal*, 8(4), 453–479.

Jencks, C., Smith, M., Acland, H., Bane, M. J., Cohen, D., Gintis, H., Heyns, B., & Michelson, S. (1972). *Inequality: A Reassessment of the Effect of Family and Schooling in America*. Middlesex: Penguin Books.

Jones, F. L. & Kelley, J. (1984). Decomposing differences between groups: A cautionary note on measuring discrimination. *Sociological Methods & Research*, 12(3), 323–343.

Judge, T. A., Erez, A., Bono, J., & Thoresen, C. J. (2002). Are measures of self-esteem, neuroticism, locus of control, and generalized self-efficacy indicators of a common core construct? *Journal of Personality and Social Psychology*, 83(3), 693–710.

Judge, T. A., Higgins, C. A., Thorensen, C. J., & Barrick, M. R. (1999). The Big Five personality traits, general mental ability, and career success across the life span. *Personnel Psychology*, 52, 621–652.

Judge, T. A. & Kammeyer-Mueller, J. D. (2007). Personality and career success. In H. P. Gunz & M. A. Peiperl (Eds.), *Handbook of Career Studies* (pp. 56–78). Thousand Oaks, CA: Sage.

Kagan, J. (1997). Biology and the child. In W. Damon & N. Eisenberg (Eds.), *Handbook of Child Psychology*, volume 13 (pp. 221–241). New York: Wiley.

Kalmijn, M. (1991). Status homogamy in the united states. *American Journal of Sociology*, 97(2), 496–523.

Karlson, K., Holm, A., & Breen, R. (2012). Comparing regression coefficients between same-sample nested models using logit and probit: A new method. *Sociological Methodology*, 42, 286–313.

Keck, W. & Saraceno, C. (2013). The impact of different social-policy frameworks on social inequalities among women in the European Union: The labour-market participation of mothers. *Social Politics*, 20(3), 297–328.

Kelley, H. (1973). The processes of causal attribution. *American Psychologist*, 28, 107–128.

Klein, D., Fencil-Morse, E., & Seligman, M. (1976). Learned helplessness, depression, and the attribution of failure. *Journal of Personality and Social Psychology*, 33(5), 508–516.

Klimstra, T., Luyckx, K., Germeijs, V., Meeus, W., & Goossens, L. (2012). Personality traits and educational identity formation in late adolescents: Longitudinal associations and academic progress. *Journal of Youth Adocescence*, 41, 346–361.

Kluczniok, K., Lehrl, S., Kuger, S., & Rossbach, H.-G. (2013). Quality of the home learning environment during preschool age - domains and contextual conditions. *European Early Childhood Education Research Journal*, 21(3), 420–438.

Kohn, M. (1963). Social class and parent-child relationships: An interpretation. *American Journal of Sociology*, 68(4), 471–480.

Kohn, M. (1983). On the transmission of values in the family: A preliminary formulation. *Research in Sociology of Education and Socialization*, 4, 3–12.

Kohn, M. (2006). *Change and Stability: A Cross-National Analysis of Social Structure and Personality*. Boulder, CO: Paradigm Publishers.

Kohn, M., Kazimierz, M., & Schoenbach, C. (1986). Social stratification and the transmission of values in the family: A cross-national assessment. *Sociological Forum*, 1(1), 73–102.

Kohn, M., Zaborowski, W., Janicka, K., Mach, B. W., Khmelko, V., Slomczynski, K. M., Heyman, C., & Podobnik, B. (2000). Complexity of activities and personality under conditions of radical social change: A comparative analysis of Poland and Ukraine. *Social Psychology Quaterly*, 63(3), 187–208.

Kolb, A. Y. & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education*, 4(2), 193–212.

Kristen, C., Shavit, Y., Chachashvili-Bolotin, S., Roth, T., & Adler, I. (2014). Achievement differences between immigrant and native fourth graders in Germany and Israel. In R. K. Silbereisen, Y. Shavit, & P. Titzmann (Eds.), *The Challenges of Diaspora Migration: Interdisciplinary Perspectives on Israel and Germany* (pp. 191–209). Farnham: Ashgate.

Kroh, M. (2008). Documentation of sample sizes and panel attrition in the German Socio Economic Panel (SOEP) (1984 until 2006). *DIW Data Documentation*, 27.

Krohne, H. W. (1996). Individual differences in coping. In M. Zeidner & N. Endler (Eds.), *Handbook of Coping. Theory, Research, Applications*. New York: Wiley.

Kuhn, P. & Weinberger, C. (2005). Leadership skills and wages. *Journal of Labor Economics*, 23, 395–436.

Kulatunga-Moruzi, C. & Norman, G. R. (2002). Validity of admissions measures in predicting performance outcomes: The contribution of cognitive and non-cognitive dimensions. *Teaching and Learning in Medicine*, 14(1), 34–42.

Lareau, A. & Weininger, E. B. (2003). Cultural capital in educational research: A critical assessment. *Theory and Society*, 32(5/6), 567–606.

Lauterbach, W. & Fend, H. (2017). Educational mobility and equal opportunity in different german tracking systems - findings from the LifE study. In H.-P. Blossfeld, S. Buchholz, J. Skopek, & M. Triventi (Eds.), *Models of Secondary Education and Social Inequality* (pp. 93–110). Cheltenham, UK: Edward Elgar.

Lefcourt, H. M. (1973). The function of the illusions of control and freedom. *American Psychologist*, 28(5), 417–425.

Lefcourt, H. M. (2014). *Locus of Control: Current Trends in Theory & Research*. Lilington, NC: Psychology Press.

Leopold, L. & Engelhardt, H. (2013). Education and physical health trajectories in old age. evidence from the survey of health, ageing and retirement in Europe. *International Journal of Public Health*, 58(1), 23–31.

Lepsius, R. (1963). Cultural dimensions of social stratification [Kulturelle Dimensionen der sozialen Schichtung]. In *Interessen, Ideen und Institutionen (reprinted 1990)* (pp. 96–116). Wiesbaden: Springer.

Lohmann, H., Giesselmann, M., & Witzke, S. (2011). Bioage17: The youth questionnaire. In J. R. Frick & J. Goebel (Eds.), *Data Documentation 61, Biography and Life History Data in the German Socio Economic Panel (SOEP, v27, 1984- 2010)* (pp. 131–141). Berlin: DIW.

Long, J. S. & Bollen, K. A. (1993). *Testing Structural Equation Models*. London: Sage.

Lozano, J. (2016). Personality and behavior in social dilemmas: Testing the situational strength hypothesis and the role of hypothetical versus real incentives. *Journal of Personality*, 84(1), 71–78.

Lucas, S. (2001). Effectively maintained inequality: Education transition, track mobility, and social background effects. *The American Journal of Sociology*, 106(6), 1642–1690.

MacCallum, R. C., Widaman, K. F., Preacher, K. J., & Hong, S. (2001). Sample size in factor analysis: The role of model error. *Multivariate Behavioral Research*, 36(4), 611–637.

Magnus, K., Diener, E., Fujita, F., & Pavot, W. (1993). Extraversion and Neuroticism as predictors of objective life events: A longitudinal study. *Journal of Personality and Social Psychology*, 65(5), 1046–1053.

Malecki, A., Schneider, C., Vogel, S., & Wolters, M. (2014). *Schools at a Glance [Schulen auf einen Blick]*. Statistisches Bundesamt.

Mare, R. (1980). Social background and school continuation decisions. *Journal of the American Statistical Association*, 75, 295–305.

Mare, R. (1981). Change and stability in educational stratification. *American Sociological Review*, 46, 72–87.

Matthews, G. (2009). Personality and performance: Cognitive processes and models. In P. J. Corr & G. Matthews (Eds.), *The Cambridge Handbook of Personality Psychology* (pp. 400–426). Cambridge: Cambridge University Press.

Matthews, G., Davis, D. R., Westerman, Stephen, J., & Stammers, R. B. (2000). *Human Performance: Cognition, Stress, and Individual Differences*. Lilington, NC: Psychology Press.

Mayer, S., Oreopoulos, P., & Gallegos, S. (2015). Utype behavioral insights to increase parental engagement: The parent and children together (PACT) Intervention. *Working Paper 21602*, NBER working paper series.

McAdams, D. P. (1997). A conceptual history of personality psychology. In R. Hogan, J. Johnson, & S. Briggs (Eds.), *Handbook of Personality Psychology* (pp. 3–38). San Diego: Academic Press.

McCrae, R. R. & Costa, P. T. (1991). Conceptions and correlates of openness to experience. In R. Hogan, J. Johnson, & S. Briggs (Eds.), *Handbook of Personality Psychology* (pp. 826–847). San Diego: Academic Press.

McCrae, R. R. & Costa Jr., P. T. (1999). A Five-Factor theory of personality. In L. A. Pervin & O. P. John (Eds.), *Handbook of Personality. Theory and Research* (pp. 139–153). New York: Guilford Press.

McCrae, R. R. & John, O. P. (1992). An introduction to the Five-Factor model and its applications. *Journal of Personality*, 60(2), 175–215.

Merton, R. K. (1968). The matthew effect in science. *Science*, 159(3810), 56–63.

Mervielde, I. & Asendorpf, J. B. (2000). Variable-centered and person-centered approaches to childhood personality. In S. Hampson (Ed.), *Advances in Personality Psychology* (pp. 37–76). London: Routledge.

Messick, S. (1996). Bridging cognition and personality in education: The role of style in performance and development. *European Journal of Personality*, 10, 353–376.

Mirowsky, J. & Ross, C. E. (2007). Life course trajectories of perceived control and their relationships to education. *American Journal of Sociology*, 112 (5), 1339–1382.

Mischel, W. (1973). Toward a cognitive social learning reconceptualization of personality. *Psychological Review*, 80, 252–283.

Mischel, W. & Shoda, Y. (1985). A cognitive-affective system theory of personality: Reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, 102, 246–268.

Mischel, W., Shoda, Y., & Rodriguzez, M. L. (1989). Delay of gratification in children. *Science*, 244, 933–938.

Montgomery, J. (2016). The efficient measurement of personality: Adaptive personality inventories for survey research. published online, retrieved from http://q-aps.princeton.edu/sites/default/files/q-aps/files/adaptivepersonalityinventories.pdf.

Mueller, G. & Plug, E. (2006). Estimating the effect of personality on male and female earnings. *ILR Review*, 60(1), 3–22.

Mueller, W., Pollak, R., Reimer, D., & Schindler, S. (2017). *Tertiary Education and Social Inequality [Hochschulbildung und soziale Ungleichheit]*. Wiesbaden: Springer.

Myers, I. B. (1963). *The Myers-Briggs Type Indicator: Manual*, volume II. Palo Alto, California.

Nelson, J. & Beggan, J. (2004). Self-serving judgement about winning the lottery. *Journal of Psychology*, 138(3), 253–264.

Neyer, F. J. & Asendorpf, J. B. (2001). Personality-relationship transaction in young adulthood. *Journal of Personality and Social Psychology*, 81(6), 1190–1204.

Nieuwenhuis, J., Hooimeijer, P., & Meeus, W. (2015). Neighbourhood effects on educational attainment of adolescents, buffered by personality and educational commitment. *Social science research*, 50, 100–109.

Noftle, E. E. & Robins, R. W. (2007). Personality predictors of academic outcomes: Big five correlates of GPA and SAT scores. *Journal of Personality and Social Psychology*, 93(1), 116–130.

Oaxaca, R. (1973). Male-female wage differentials in urban labor markets. *International Economic Review*, 14, 693–709.

O'Connor, M. C. & Paunonen, S. V. (2007). Big five personality predictors of post-secondary academic performance. *Personality and Individual Differences*, 43(5), 971 – 990.

OECD (2013). *PISA 2012 Results: What Makes Schools Successful? Resources, Policies and Practices*, volume IV. Pisa: OECD Publishing.

Pakpahan, E., Hoffmann, R., & Kroeger, H. (2015). Statistical methods for causal analysis in life course research: An illustration of a cross-lagged structural equation model, a latent growth model, and an autoregressive latent trajectories model. (0), 1–19. http://dx.doi.org/10.1080/13645579.2015.1091641, published online only.

Passolunghi, M., Mammarella, I., & Altoe, G. (2008). Cognitive abilities as precursors of the early acquisition of mathematical skills during first through second grades. *Developmental Neuropsychology*, 33(3), 229–250.

Paunonen, S. V. & Ashton, M. C. (2001). Big five predictors of academic achievement. *Journal of Research in Personality*, 35, 78–90.

Pettit, G. S., Bates, J. E., & Dodge, K. A. (1997). Supportive parenting, ecological context, and children's adjustment: A seven-year longitudinal study. *Child Development*, 68(5), 908–923.

Plomin, R. & Bergeman, C. (1991). The nature of nurture: Genetic influence on 'environmental' measures. *Behavioral and Brain Sciences*, 14, 373–386.

Plomin, R. & Caspi, A. (1999). Behavioral genetics and personality. In L. A. Pervin & D. C. John (Eds.), *Handbook of Personality Theory and Research* (pp. 251–277). New York: Guilford.

Plomin, R., Kagan, J., Emde, R. N., Reznik, J. S., Braungart, J. M., Joann, R., Campos, J., Zahn-Waxler, C., Corley, R., Fulker, D. W., & DeFries, J. (1993). Genetic change and continuity from fourteen to twenty months: The MacArthur Longitudinal Twin Study. *Child Development*, 64(5), 1354–1376.

Pollak, R. & Reimer, D. (2005). The impact of social origin on the transition to tertiary education in West Germany 1983 and 1999. *Working paper No. 85*, Mannheimer Zentrum für Europäische Sozialforschung.

Prociuk, T. J. & Breen, L. J. (1975). Defensive externality and its relation to academic performance. *Journal of Personality and Social Psychology*, 31 (3), 549–556.

Protsch, P. & Solga, H. (2015). How employers use signals of cognitive and noncognitive skills at labour market entry: Insights from field experiments. *European Sociological Review*, 31(5), 521–532.

Reddig, M. & Tranow, U. (2014). Preference formation and social structure. A comparison of bourdieu's theory of practice and lindenberg's theory of social rationality. *Zeitschrift für Soziologie*, 43(4), 302–318.

Reimer, D. & Pollak, R. (2010). Educational expansion and its consequences for vertical and horizontal inequalities in access to higher education in West Germany. *European Sociological Review*, 26(4), 415–430.

Roberts, B. W. & Jackson, J. J. (2008). Sociogenomic personality psychology. *Journal of Personality*, 76 (6), 1523–1544.

Roberts, B. W., Wood, D., & Caspi, A. (2008). The development of personality traits in adulthood. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of Personality: Theory and Research* (pp. 375–398). New York: Guilford Press.

Robins, R., John, O., Caspi, A., Moffitt, T., & Stouthamer-Loeber, M. (1996). Resilient, overcontrolled, and undercontrunder boys: Three replicable personality types. *Journal of Social Psychology*, 70, 157–171.

Rosen, J. A., Glennie, E. J., Dalton, B. W., Lennon, J. M., & Bozic, R. N. (2010). *Noncognitive Skills in the Classroom: New Perspectives on Educational Research*. Research Triangle Park, NC: RTI International.

Rotter, J. (1954). *Social Learning in Clinical Psychology*. Englewood Cliffs: Prentice-Hall.

Rotter, J. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, 80(1), 1–28.

Rotter, J. B. (1990). Internal versus external control of reinforcement: A case history of a variable. *American Psychologist*, 45(4), 489–493.

Royer, J. M., Cisero, C. A., & Carlo, M. S. (1993). Techniques and procedures for assessing cognitive skills. *Review of Educational Research*, 63(2), 201–243.

Royer, J. M., Tronsky, L., Chan, Y., Jackson, S., & Marchant, H. (1999). Math-fact retrieval as the cognitive mechanism underlying gender differences in math test performance. *Contemporary Educational Psychology*, 24(3), 181–266.

Rutter, M. (1985). Family and school influences in cognitive development. *Journal of Child Psychology and Psychiatry*, 26 (5), 683–704.

Ryberg, R., Bauldry, S., Schultz, M. A., Steinhoff, A., & Shanahan, M. (2017). Personality and the intergenerational transmission of educational attainment: Evidence from Germany. *Journal of Youth and Adolescence*, 46(10), 2181–2193.

Schnabel, K. U., Alfeld, C., Eccles, J., Köller, O., & Baumert, J. (2002). Parental influence on students' educational choices in the United States and Germany: Different ramifications - same effect? *Journal of Vocational Behavior*, 60(2), 178–198.

Schneider, S. L. (2009). *Confusing credentials: the cross-nationally comparable measurement of educational attainment*. PhD thesis, University of Oxford.

Schofield, C., Johnson, A., Inhoff, A., & Coles, M. (2012). Social anxiety and difficulty disengaging threat: Evidence from eye-tracking. *Cognition & Emotion*, 26(2), 300–311.

Schuehrer, S., Carbonaro, W., & Grodsky, E. (2017). Reproduction of inequality in educational attainment through curricular differentiation in secondary school. A case study of the USA. In H.-P. Blossfeld, N. Kulic, J. Skopek, & M. Triventi (Eds.), *Models of Secondary Education and Social Inequality*, eduLIFE Lifelong Learning Series. Vol. 3 (pp. 249–267). Cheltenham, UK: Edward Elgar.

Schuhrer, S., Bills, D. B., & Weiss, F. (2015). Gender differences in the labor market entry and their long-term consequences in the United States. In H.-P. Blossfeld, N. Kulic, J. Skopek, & M. Triventi (Eds.), *Gender, Education and Employment*, eduLIFE Lifelong Learning Series. Vol. 2 (pp. 104–121). Edward Elgar.

Segal, C. (2008). Classroom behaviour. *Journal of Human Resources*, 43(4), 783–814.

Selezneva, E. & Van Kerm, P. (2016). A distribution-sensitive examination of the gender wage gap in Germany. *Journal of Economic Inequality*, 14, 21–40.

Seligman, M. (1972). Learned helplessness. *Annual Review of Medicine*, 23, 407–412.

Seligman, M. E., Maier, S. F., & Geer, J. H. (1968). Alleviation of learned helplessness in the dog. *Journal of Abnormal Psychology*, 73(3), 256–262.

Shanahan, M., Vaisey, S., Erickson, L. D., & Smolen, A. (2008). Environmental contingencies and genetic propensities: Social capital, educational continuation, and dopamine receptor gene DRD2. *American Journal of Sociology*, 114, 260–286.

Shavit, Y. & Blossfeld, H.-P. (1993). *Persistent Inequality: Changing Educational Attainment in Thirteen Countries*. Boulder, CO: Westview Press.

Simons, R. L., Beaman, Jay, C., D., R., & Chao, W. (1993). Childhood experience, conceptions of parenting, and attitudes of spouse as determinants of parental behavior. *Journal of Marriage and Family*, 55(1), 91–106.

Simons, R. L., Lin, K.-H., & Gordon, L. C. (1998). Socialization in the family of origin and male dating violence: A prospective study. *Journal of Marriage and Family*, 60(2), 467–478.

Simons, R. L., Lorenz, F. O., Conger, R. D., & Wu, C.-I. (1992). Support from spouse as mediator and moderator of the disruptive influence of economic strain on parenting. *Child Development*, 63 (5), 1282–1301.

Skinner, E. A. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology*, 71(3), 549–570.

Skrondal, A. & Rabe-Hesketh, S. (2004). *Generalized Latent Variable Modeling. Multilevel, Longitudinal, and Structural Equation Models*. London: Chapman & Hall.

SOEP Group (2017). Soep-core v32 - documentation of person-related status and generated variables in $pgen. *SOEP Survey Papers*, 411, 1–50.

Specht, J., Egloff, B., & Schmukle, S. C. (2013). Examining mechanisms of personality Maturation. The impact of life satisfaction on the development of the Big Five personality traits. *Social Psychology and Personality Science*, 18, 1–9.

Spiess, M. (2004). Derivation of design weights: The case of the German Socio-Economic Panel (SOEP). *DIW Data Documentation*, 8, 1–17.

Spinath, B., Freudenthaler, H., & Neubauer, A. C. (2010). Domain-specific school achievement in boys and girls as predicted by intelligence, personality and motivation. *Personality and Individual Differences*, 48(4), 481–486.

Sternberg, R. J. (1988). Mental self-government: A theory of intellectual styles and their development. *Human Development*, 31, 197–224.

Sternberg, R. J. (1994). Thinking styles: Theory and assessment at the interface between intelligence and personality. In R. J. Sternberg & P. Ruzgis (Eds.), *Intelligence and Personality* (pp. 169–187). New York: Cambridge University Press.

Tabachnick, B. G. & Fidell, L. S. (2001). *Using Multivariate Statistics*. Boston: Allyn and Bacon.

Thaler, R. (2015). *Misbehaving: The Making of Behavioral Economics*. New York: W.W. Norton.

Thaler, R. & Bernartzi, S. (2004). Save more tomorrow: Using behavioral economics to increase employee saving. *Journal of Political Economy*, 112(1), 164–187.

Thompson, E. R. (2008). Development and validation of an international english big-five mini-markers. *Personality and Individual Differences*, 45(6), 542–548.

Though, P. (2016, June). How kids learn resilience. *The Atlantic*, Retrieved from http://www.theatlantic.com/magazine/archive/2016/06/how-kids-really-succeed/480744/.

Van Eijck, K. & De Graaf, P. M. (2004). The Big Five at school: The impact of personality on educational attainment. *The Netherlands' Journal of Social Sciences*, 40(1), 24–40.

Weichselbaumer, D. & Winter-Ebmer, R. (2003). A meta-analysis of the international gender wage gap. *Working Paper 0311*, Department of Economics, Johannes Kepler University of Linz.

Weiner, B. (1972). Attribution theory, achievement motivation, and the educational process. *Review of Educational Research*, 42(2), 203–215.

Weinert, F. E. (2001). Comparative measurement of performance in schools – a controversial matter of course [Vergleichende Leistungsmessung in Schulen - eine umstrittene Selbstverständlichkeit]. In F. E. Weinert (Ed.), *Leistungsmessungen in Schulen* (pp. 17–32). Weinheim and Basel: Beltz Pädagogik.

Weinhardt, M. & Schupp, J. (2011). Multi-Itemskalen im SOEP Jugenfragebogen. *SOEP Data Documentation No. 60*, DIW, Berlin.

Wiggins, R. D. & Sacker, A. (2002). Strategies for handling missing data in sem: A user's perspective. In G. A. Marcoulides & I. Moustaki (Eds.), *Latent Variable and Latent Structure Models* (pp. 105–120). London: Lawrence Erlbaum Associates.

Winter, D. G. & Barenbaum, N. B. (1999). History of modern personality theory and research. In L. A. Pervin & O. John (Eds.), *Handbook of Personality: Theory and Research* (pp. 3–28). New York: Guilford Press.

Winterton, J., Delamare-LeDeist, F., & Stringfellow, E. (2005). *Typology of Knowledge, Skills and Competences: Clarification of the Concept and Prototype*. Reference series 64. Luxembourg: CEDEFOP.

Wortman, J., Lucas, R. E., & Donnellan, M. B. (2012). Stability and change in the Big Five personality domains: Evidence from a longitudinal study of Australians. *Psychology and Aging*, 27(4), 867–874.

Zelenski, J. M., Santoro, M. S., & Whelan, D. C. (2012). Would introverts be better off if they acted more like extraverts? Exploring emotional and cognitive consequences of counterdispositional behavior. *Emotion*, 12(2), 290–303.

Zhang, L.-F. (2002). Thinking styles: Their relationships with modes of thinking and academic performance. *Educational Psychology*, 22(3), 331–348.

Appendix

Table A: Descriptives of the youth sample by gender

17-year-old	**N**	**Mean**	**Std. Dev.**	**Min**	**Max**
Total					
Maths grades	3,269	4.0	1.0	1	6
Openness	1,345	4.8	1.2	1	7
Conscientiousness	1,345	5.0	1.1	1.3	7
Extraversion	1,345	4.8	1.3	0.5	7.5
Agreeableness	1,345	5.4	1.0	1	7
Neuroticism	1,345	3.8	1.3	0.5	7.5
Locus of Control	3,104	4.9	0.8	1.6	7
Father German	3,324	0.89	0.32	0	1
Female					
Maths grades	1,614	4.0	1.0	1	6
Openness	643	5.0	1.1	1	7
Conscientiousness	643	5.1	1.1	1.3	7
Extraversion	643	4.9	1.3	0.5	7.5
Agreeableness	643	5.6	0.9	2	7
Neuroticism	643	4.0	1.3	0.5	7.5
Locus of Control	1,536	4.9	0.8	1.8	6.8
Father German	1,643	0.88	0.32	0	1
Male					
Maths grades	1,655	4.1	1.0	1	6
Openness	702	4.6	1.2	1.5	7
Conscientiousness	702	4.8	1.1	1.5	7
Extraversion	702	4.7	1.3	0.8	7.5
Agreeableness	702	5.3	1.0	1	7
Neuroticism	702	3.5	1.2	0.5	7.5
Locus of Control	1,568	4.9	0.8	1.6	7
Father German	1,681	0.89	0.31	0	1

Table B: EGP of parents and type of school by gender

EGP Father	Female	Male	Total
Inactive	274	256	530
	20.37	18.08	19.2
Unskilled & farm labour	330	333	663
	24.54	23.52	24.01
Self employed	164	167	331
	12.19	11.79	11.99
Routine non-manual	91	109	200
	6.77	7.7	7.24
Low service	239	284	523
	17.77	20.06	18.94
High service	247	267	514
	18.36	18.86	18.62
Total	1,345	1,416	2,761
	100	100	100
EGP Mother			
Inactive	234	240	474
	19.7	18.85	19.26
Unskilled & farm labour	207	203	410
	17.42	15.95	16.66
Self employed	147	144	291
	12.37	11.31	11.82
Routine non-manual	192	219	411
	16.16	17.2	16.7
Low service	236	272	508
	19.87	21.37	20.64
High service	172	195	367
	14.48	15.32	14.91
Total	1,188	1,273	2,461
	100	100	100
Type of school			
Lower Secondary	230	341	571
	16.07	23.65	19.87
Intermediate Secondary	501	517	1,018
	35.01	35.85	35.43
Upper Secondary	700	584	1,284
	48.92	40.5	44.69
Total	1,431	1,442	2,873
	100	100	100

Table C: Descriptives of the adult sample by gender

Adults	**N**	**Mean**	**Std. Dev.**	**Min**	**Max**
Total					
Years of education	13,497	11.6	2.6	7	18
Age	8,164	47.2	15.9	17	94
Openness	16,896	4.5	1.1	1	7
Conscientiousness	16,897	5.8	0.8	1	7
Extraversion	16,894	4.8	1.0	1	7
Agreeableness	16,897	5.4	0.9	1	7
Neuroticism	16,897	3.8	1.1	1	7
Locus of Control	10,428	4.7	0.7	1	6.8
Income	11,641	2177	1887	0	67083
Married	16,972	0.60	0.49	0	1
Women					
Years of education	6,300	12.5	2.7	7	18
Age	3,799	47.6	15.4	17	94
Openness	7,883	4.5	1.1	1	7
Conscientiousness	7,884	5.8	0.9	1	7
Extraversion	7,883	4.7	1.0	1	7
Agreeableness	7,883	5.2	0.9	1	7
Neuroticism	7,883	3.5	1.1	1	7
Locus of Control	4,913	4.7	0.7	1	6.8
Income	5,669	2794	2228	0	67083
Married	8,918	0.58	0.49	0	1
Men					
Years of education	7,197	12.1	2.6	7	18
Age	4,365	47.6	15.7	17	90
Openness	9,013	4.6	1.1	1	7
Conscientiousness	9,013	5.9	0.8	1	7
Extraversion	9,011	5.0	1.0	1	7
Agreeableness	9,014	5.6	0.8	1	7
Neuroticism	9,014	4.1	1.1	1	7
Locus of Control	5,515	4.6	0.7	1.7	6.6
Income	5,972	1618	1351	0	32375
Married	8,054	0.63	0.48	0	1

GSOEP Youth Questionnaire

Waves 2004-2013

Grand mean for personality, income and years of education,

wave 2004 for Age and marital status (time of measurement in the model)

Table D: Correlation table for adults

	Years of education	Income	Age	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism	Locus of Control
Years of education	1								
Income	0.36	1							
	0.00								
Age	-0.21	0.12	1						
	0.00	0.00							
Openness	0.19	0.03	-0.07	1					
	0.00	0.00	0.00						
Conscientiousness	-0.07	0.04	0.11	0.15	1				
	0.00	0.00	0.00	0.00					
Extraversion	0.01	-0.03	-0.08	0.38	0.18	1			
	0.22	0.00	0.00	0.00	0.00				
Agreeableness	-0.02	-0.08	0.11	0.13	0.30	0.08	1		
	0.03	0.00	0.00	0.00	0.00	0.00			
Neuroticism	-0.11	-0.16	0.06	-0.06	-0.09	-0.16	-0.11	1	
	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Locus of Control	0.21	0.21	-0.09	0.10	0.15	0.18	0.12	-0.35	1
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

GSOEP main questionnaire

Waves 2004-2013

Grand means over all waves

Household income		0.33	0.41**	0.30
		(0.32)	(0.21)	(0.34)
Father German (1=yes)		0.40	0.27	0.31
		(0.44)	(0.35)	(0.46)
Personality mother				
Openness			0.21**	
			(0.09)	
Conscientiousness			−0.16	
			(0.12)	
Extraversion			−0.05	
			(0.09)	
Agreeableness			0.28* * *	
			(0.10)	
Neuroticism			0.02	
			(0.08)	
Locus of Control			−0.02	
			(0.20)	
Personality father				
Openness			−0.13	
			(0.09)	
Conscientiousness			0.10	
			(0.11)	
Extraversion			0.03	
			(0.09)	
Agreeableness			−0.15	
			(0.10)	
Neuroticism			0.01	
			(0.08)	
Locus of Control			0.03	
			(0.18)	
Personality child				
Openness				0.18
				(0.13)
Conscientiousness				−0.12
				(0.11)
Extraversion				−0.09
				(0.11)
Agreeableness				−0.08
				(0.14)
Neuroticism				−0.09
				(0.12)
Locus of Control				0.48**
				(0.19)
Constant	−3.71* * *	−245.95*	−38.98	−235.66
	(0.95)	(149.40)	(50.76)	(149.80)

Table E: Multinomial logistic regression, average marginal effects of attending intermediate secondary or upper secondary' school, robust standard errors

	(1)	(2)	(3)	(4)
Lower secondary - Reference				
Intermediate secondary				
Mother's education	0.21***	0.17**	0.25***	0.17**
	(0.06)	(0.07)	(0.05)	(0.07)
Father's education	0.15**	0.10	0.13**	0.12*
	(0.07)	(0.08)	(0.06)	(0.08)
Year of birth		0.12	0.02	0.11
		(0.08)	(0.03)	(0.08)
Gender (1=boys)		−0.36	−0.50***	−0.48*
		(0.23)	(0.16)	(0.25)
EGP father				
(Reference=inactive)				
Unskilled &				
farm labour		−0.76	−0.43	−0.88
		(0.74)	(0.36)	(0.77)
Skilled manual		−3.28***	−0.52	−3.32***
		(0.98)	(0.37)	(1.03)
Self employed		−3.17**	−0.92*	−3.04**
		(1.42)	(0.55)	(1.53)
Routine non-manual		−1.85*	−0.31	−1.98*
		(1.12)	(0.45)	(1.17)
Low service		−2.18**	−0.26	−2.23**
		(0.98)	(0.43)	(1.00)
High service		−1.70	−0.01	−1.92
		(1.09)	(0.69)	(1.19)
EGP mother				
(Reference=inactive)				
Unskilled &				
farm labour		1.12	0.71**	1.17
		(0.70)	(0.34)	(0.74)
Skilled manual		3.50***	0.68*	3.55***
		(0.98)	(0.38)	(1.05)
Self employed		3.49**	1.12**	3.27**
		(1.38)	(0.56)	(1.50)
Routine non-manual		2.28**	0.83**	2.31**
		(1.03)	(0.36)	(1.11)
Low service		2.60***	0.90**	2.60***
		(0.92)	(0.41)	(0.96)
High service		2.59**	0.48	2.68**
		(1.07)	(0.69)	(1.18)

Upper secondary				
Mother's education	0.44∗∗∗	0.39∗∗∗	0.42∗∗∗	0.38∗∗∗
	(0.07)	(0.07)	(0.05)	(0.07)
Father's education	0.52∗∗∗	0.45∗∗∗	0.45∗∗∗	0.48∗∗∗
	(0.08)	(0.08)	(0.06)	(0.08)
Year of birth			0.15∗	0.01
0.16∗∗				
		(0.08)	(0.03)	(0.08)
Gender (1=boys)		−0.73∗∗∗	−0.87∗∗∗	−0.73∗∗∗
		(0.25)	(0.17)	(0.27)
EGP father				
(Reference=inactive)				
Unskilled &				
farm labour		−1.33	−0.30	−1.61
		(1.52)	(0.50)	(1.56)
Skilled manual		−3.56∗∗	−0.31	−3.65∗∗
		(1.46)	(0.46)	(1.57)
Self employed		−3.69∗∗	−0.64	−3.72∗∗
		(1.66)	(0.59)	(1.81)
Routine non-manual		−1.79	0.11	−1.91
		(1.46)	(0.52)	(1.58)
Low service		(1.52)	(0.53)	(1.63)
High service		−1.89	0.12	−2.30
		(1.38)	(0.76)	(1.60)
EGP mother				
(Reference=inactive)				
Unskilled &				
farm labour		1.31	0.70	1.48
		(1.48)	(0.46)	(1.55)
Skilled manual		3.45∗∗	0.78∗	3.56∗∗
		(1.44)	(0.45)	(1.59)
Self employed		3.77∗∗	1.34∗∗	3.62∗∗
		(1.63)	(0.58)	(1.80)
Routine non-manual		1.97	1.01∗∗	2.02
		(1.38)	(0.42)	(1.54)
Low service		2.51∗	0.76	2.62
		(1.47)	(0.48)	(1.60)
High service		2.41∗	0.74	2.58
		(1.38)	(0.75)	(1.62)
Household income		1.15∗∗∗	0.98∗∗∗	1.13∗∗∗
		(0.35)	(0.23)	(0.37)
Father German (1=yes)		0.64	0.41	0.72
		(0.59)	(0.44)	(0.58)
Personality mother				
Openness			0.20∗∗	

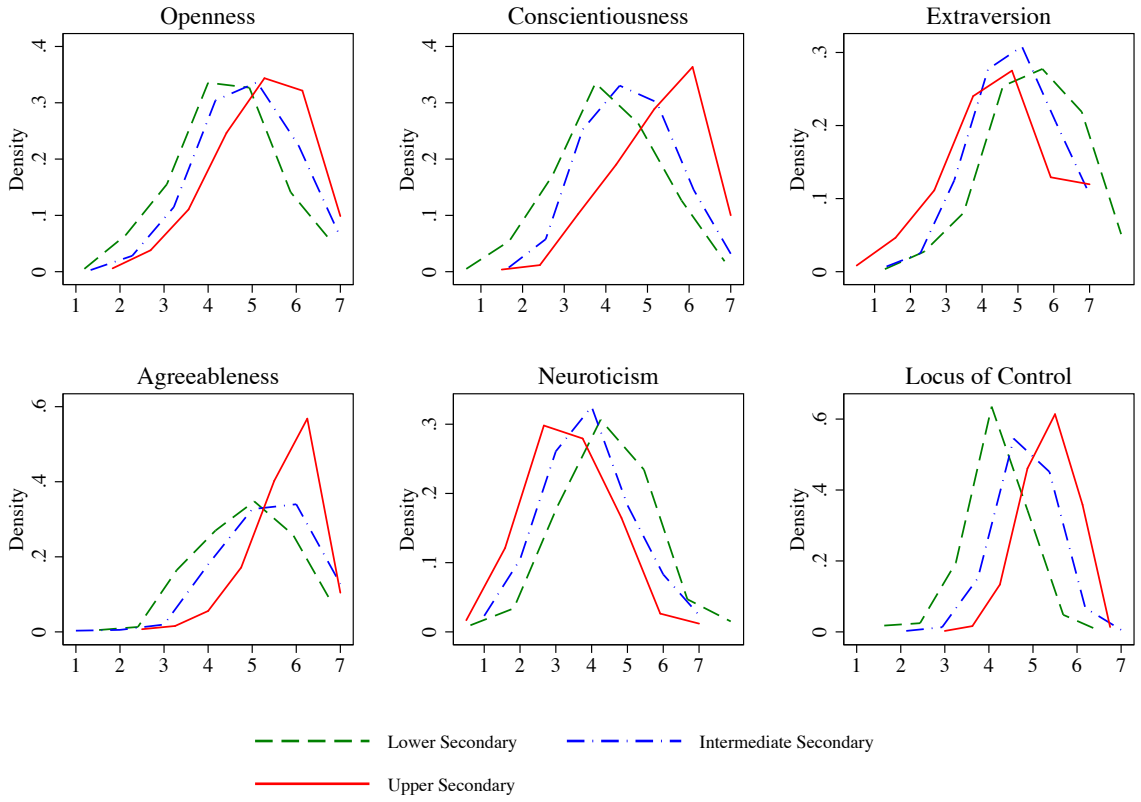
			(0.09)	
Conscientiousness			−0.08	
			(0.13)	
Extraversion			−0.03	
			(0.10)	
Agreeableness			0.25**	
			(0.11)	
Neuroticism			−0.05	
			(0.08)	
Locus of Control			−0.24	
			(0.22)	
Personality father				
Openness			−0.07	
			(0.10)	
Conscientiousness			−0.05	
			(0.12)	
Extraversion			0.02	
			(0.10)	
Agreeableness			−0.13	
			(0.11)	
Neuroticism			0.09	
			(0.09)	
Locus of Control			0.42**	
			(0.20)	
Personality child				
Openness				0.48***
				(0.14)
Conscientiousness				−0.13
				(0.12)
Extraversion				−0.12
				(0.12)
Agreeableness				−0.04
				(0.15)
Neuroticism				−0.02
				(0.12)
Locus of Control				0.47**
				(0.21)
Constant	−11.76***	−320.54**	−37.84	−334.01**
	(1.13)	(155.87)	(54.40)	(156.89)
N	810	810	810	810
pseudo R^2	0.186	0.225	0.209	0.241

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

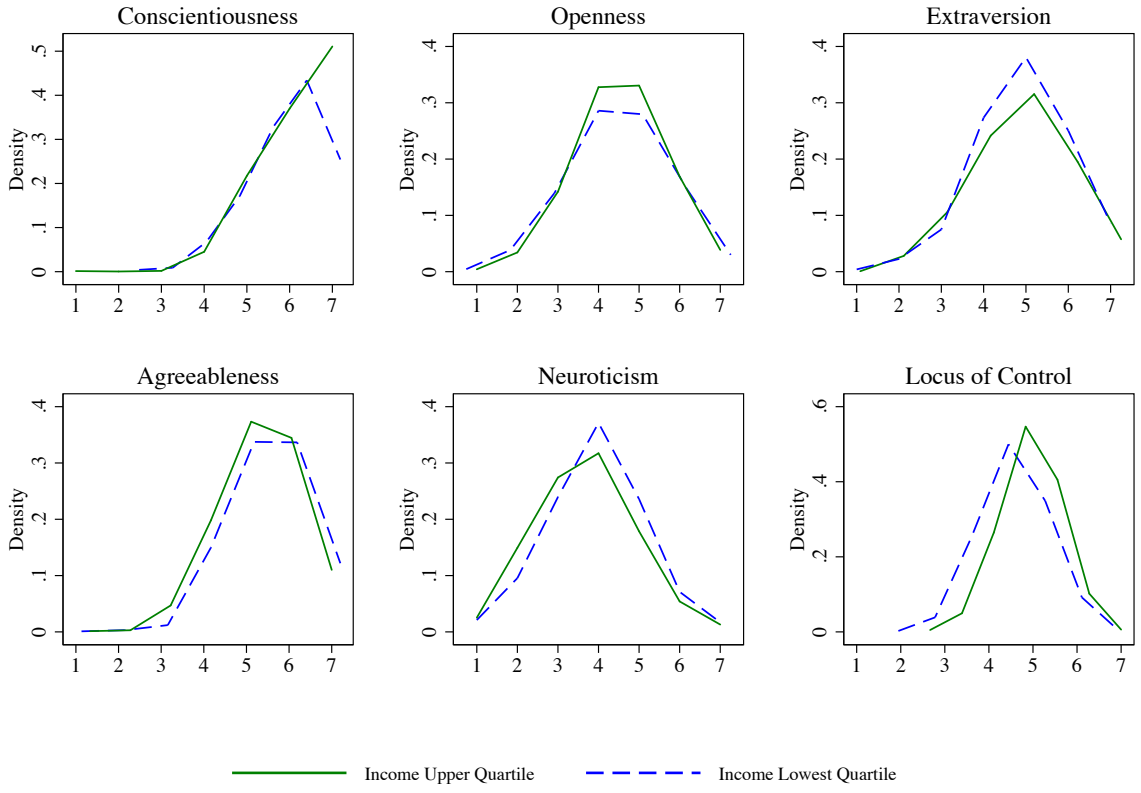
GSOEP combined Youth Questionnaire and main questionnaire

Figure A: Distribution of personality across school types of the 17-year-olds



GSOEP Youth Questionnaire

Figure B: Distribution of Personality across income 1. and 4. Quartile



GSOEP main questionnaire

Table F: Children's highest degree by highest degree of the father 2009, ISCED categories, number of cases, column percentage below

	Education father			
Education child	ISCED 1-3	ISCED 4-5	ISCED 6-8	Total
ISCED 1-3	66	1,606	922	2,594
	18.7	11.31	6.57	9.07
ISCED 4-5	77	3,727	1,940	5,744
	21.81	26.24	13.83	20.09
ISCED 6-8	210	8,871	11,167	20,248
	59.49	62.45	79.6	70.83
Total	353	14,204	14,029	28,586
	100	100	100	100

Unweighted data

GSOEP main questionnaire, wave 2009

Table G: Children's highest degree by highest degree of the mother 2009, ISCED categories, number of cases, column percentage below

	Education mother			
Education child	ISCED 1-3	ISCED 4-5	ISCED 6-8	Total
ISCED 1-3	109	1,516	969	2,594
	13.39	10.36	7.37	9.07
ISCED 4-5	183	3,812	1,749	5,744
	22.48	26.05	13.31	20.09
ISCED 6-8	522	9,303	10,423	20,248
	64.13	63.58	79.32	70.83
Total	814	14,631	13,141	28,586
	100.00	100.00	100.00	100.00

Unweighted data

GSOEP main questionnaire, wave 2009

Table H: Children's highest degree by highest degree of the father 2010, ISCED categories, number of cases, column percentage below

	Education father			
Education child	ISCED 1-3	ISCED 4-5	ISCED 6-8	Total
ISCED 1-3	52	1,461	700	2,213
	15.66	11.32	5.42	8.46
ISCED 4-5	72	3,526	1,633	5,231
	21.69	27.31	12.64	20
ISCED 6-8	208	7,922	10,585	18,715
	62.65	61.37	81.94	71.54
Total	332	12,909	12,918	26,159
	100.00	100.00	100.00	100.00

Unweighted data

GSOEP main questionnaire, wave 2010

Table I: Children's highest degree by highest degree of the mother 2010, ISCED categories, number of cases, column percentage below

	Education mother			
Education child	ISCED 1-3	ISCED 4-5	ISCED 6-8	Total
ISCED 1-3	99	1,373	741	2,213
	13.43	10.32	6.11	8.46
ISCED 4-5	167	3,610	1,454	5,231
	22.66	27.14	12	20
ISCED 6-8	471	8,318	9,926	18,715
	63.91	62.54	81.89	71.54
Total	737	13,301	12,121	26,159
	100.00	100.00	100.00	100.00

Unweighted data

GSOEP main questionnaire, wave 2010

Table J: SEM for Locus of Control on Attending a Specific School Type

	Lower or less vs other	Intermediate vs other	Upper vs other
main ←			
Gender	0.08 ∗ ∗∗	−0.01	−0.07 ∗ ∗∗
	(0.02)	(0.02)	(0.02)
Year of birth	−0.01 ∗ ∗∗	−0.00	0.01 ∗ ∗∗
	(0.00)	(0.00)	(0.00)
Locus of Control	−0.16 ∗ ∗∗	−0.01	0.17 ∗ ∗∗
	(0.04)	(0.03)	(0.04)
Constant	22.13 ∗ ∗∗	7.34	−28.50 ∗ ∗∗
	(6.14)	(6.78)	(7.11)
kl01 ←			
Locus of Control	1.00	1.00	1.00
	.	.	.
Constant	7.81 ∗ ∗∗	7.81 ∗ ∗∗	7.81 ∗ ∗∗
	(0.05)	(0.05)	(0.05)
kl03 ←			
Locus of Control	2.43 ∗ ∗∗	2.38 ∗ ∗∗	2.45 ∗ ∗∗
	(0.42)	(0.41)	(0.43)
Constant	6.49 ∗ ∗∗	6.49 ∗ ∗∗	6.49 ∗ ∗∗
	(0.05)	(0.05)	(0.05)
kl04 ←			
Locus of Control	3.13 ∗ ∗∗	3.14 ∗ ∗∗	3.16 ∗ ∗∗
	(0.48)	(0.49)	(0.50)
Constant	6.90 ∗ ∗∗	6.90 ∗ ∗∗	6.90 ∗ ∗∗
	(0.05)	(0.05)	(0.05)
kl05 ←			
Locus of Control	−0.25	−0.24	−0.27
	(0.18)	(0.18)	(0.19)
Constant	7.71 ∗ ∗∗	7.71 ∗ ∗∗	7.71 ∗ ∗∗
	(0.05)	(0.05)	(0.05)
kl06 ←			
Locus of Control	2.74 ∗ ∗∗	2.78 ∗ ∗∗	2.79 ∗ ∗∗
	(0.48)	(0.49)	(0.50)
Constant	6.20 ∗ ∗∗	6.20 ∗ ∗∗	6.20 ∗ ∗∗
	(0.05)	(0.05)	(0.05)
kl07 ←			
Locus of Control	1.95 ∗ ∗∗	1.98 ∗ ∗∗	1.97 ∗ ∗∗
	(0.37)	(0.38)	(0.38)
Constant	5.17 ∗ ∗∗	5.17 ∗ ∗∗	5.17 ∗ ∗∗

	(0.05)	(0.05)	(0.05)
kl08 ←			
Locus of Control	0.85 * **	0.82 * **	0.86 * **
	(0.25)	(0.25)	(0.26)
Constant	4.11 * **	4.11 * **	4.11 * **
	(0.05)	(0.05)	(0.05)
kl09 ←			
Locus of Control	2.71 * **	2.73 * **	2.78 * **
	(0.39)	(0.40)	(0.41)
Constant	7.51 * **	7.51 * **	7.51 * **
	(0.04)	(0.04)	(0.04)
mean(Gender)			
Constant	0.51 * **	0.51 * **	0.51 * **
	(0.01)	(0.01)	(0.01)
mean(Year of birth)			
Constant	1988.21 * **	1988.21 * **	1988.21 * **
	(0.06)	(0.06)	(0.06)
var(e.kl01)			
Constant	5.66 * **	5.66 * **	5.67 * **
	(0.14)	(0.14)	(0.14)
var(e.kl03)			
Constant	4.83 * **	4.88 * **	4.84 * **
	(0.19)	(0.19)	(0.19)
var(e.kl04)			
Constant	4.17 * **	4.18 * **	4.20 * **
	(0.21)	(0.21)	(0.21)
var(e.kl05)			
Constant	5.80 * **	5.80 * **	5.80 * **
	(0.12)	(0.12)	(0.12)
var(e.kl06)			
Constant	5.10 * **	5.07 * **	5.09 * **
	(0.21)	(0.22)	(0.22)
var(e.kl07)			
Constant	5.21 * **	5.19 * **	5.22 * **
	(0.18)	(0.19)	(0.19)
var(e.kl08)			
Constant	5.78 * **	5.79 * **	5.78 * **
	(0.15)	(0.15)	(0.15)
var(e.kl09)			
Constant	3.36 * **	3.35 * **	3.33 * **
	(0.20)	(0.20)	(0.20)
var(e.lower sec)			
Constant	0.16 * **		
	(0.01)		
var(Gender)			

Constant	0.25 ∗ ∗∗	0.25 ∗ ∗∗	0.25 ∗ ∗∗
	(0.00)	(0.00)	(0.00)
var(Year of birth)			
Constant	9.85 ∗ ∗∗	9.85 ∗ ∗∗	9.85 ∗ ∗∗
	(0.20)	(0.20)	(0.20)
var(Locus of Control)			
Constant	0.22 ∗ ∗∗	0.22 ∗ ∗∗	0.21 ∗ ∗∗
	(0.07)	(0.07)	(0.07)
cov(Gender, Year of birth)			
Constant	0.03	0.03	0.03
	(0.03)	(0.03)	(0.03)
cov(Gender, Locus of Control)			
Constant	0.02 ∗ ∗	0.02 ∗ ∗	0.01 ∗ ∗
	(0.01)	(0.01)	(0.01)
cov(Year of birth, Locus of Control)			
Constant	−0.28 ∗ ∗∗	−0.28 ∗ ∗∗	−0.28 ∗ ∗∗
	(0.05)	(0.05)	(0.05)
var(e.intermediate sec)			
Constant		0.23 ∗ ∗∗	
		(0.00)	
var(e.upper sec)			
Constant			0.24 ∗ ∗∗
			(0.00)
N	3408	3408	3408

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Weighted data

Table K: SEM for Openness to Experience on attending a specific school type

	Lower or less vs other	Intermediate vs other	Upper vs other
main ←			
Gender	0.06 ∗ ∗∗	−0.03	−0.03
	(0.02)	(0.02)	(0.03)
Year of birth	−0.01 ∗ ∗	−0.00	0.01 ∗ ∗∗
	(0.00)	(0.00)	(0.00)
Openness	−0.03	−0.04∗	0.07 ∗ ∗
	(0.02)	(0.02)	(0.03)
Constant	13.97 ∗ ∗	7.54	−20.22 ∗ ∗∗
	(6.08)	(6.82)	(7.62)
kbf04 ←			
Openness	1.00	1.00	1.00
	.	.	.
Constant	6.54 ∗ ∗∗	6.54 ∗ ∗∗	6.53 ∗ ∗∗
	(0.10)	(0.10)	(0.10)
kbf09 ←			
Openness	1.50 ∗ ∗∗	1.44 ∗ ∗∗	1.59 ∗ ∗∗
	(0.30)	(0.25)	(0.37)
Constant	4.86 ∗ ∗∗	4.85 ∗ ∗∗	4.85 ∗ ∗∗
	(0.15)	(0.15)	(0.16)
kbf14 ←			
Openness	1.25 ∗ ∗∗	1.27 ∗ ∗∗	1.26 ∗ ∗∗
	(0.13)	(0.14)	(0.13)
Constant	7.20 ∗ ∗∗	7.19 ∗ ∗∗	7.18 ∗ ∗∗
	(0.12)	(0.12)	(0.12)
mean(Gender)			
Constant	0.51 ∗ ∗∗	0.51 ∗ ∗∗	0.51 ∗ ∗∗
	(0.01)	(0.01)	(0.01)
mean(Year of birth)			
Constant	1988.23 ∗ ∗∗	1988.23 ∗ ∗∗	1988.23 ∗ ∗∗
	(0.06)	(0.06)	(0.06)
var(e.kbf04)			
Constant	3.41 ∗ ∗∗	3.39 ∗ ∗∗	3.47 ∗ ∗∗
	(0.26)	(0.25)	(0.29)
var(e.kbf09)			
Constant	6.60 ∗ ∗∗	6.75 ∗ ∗∗	6.40 ∗ ∗∗
	(0.64)	(0.54)	(0.75)
var(e.kbf14)			
Constant	4.04 ∗ ∗∗	3.95 ∗ ∗∗	4.12 ∗ ∗∗

	(0.37)	(0.34)	(0.41)
var(e.lower sec)			
Constant	0.16 * **		
	(0.01)		
var(Gender)			
Constant	0.25 * **	0.25 * **	0.25 * **
	(0.00)	(0.00)	(0.00)
var(Year of birth)			
Constant	9.87 * **	9.87 * **	9.87 * **
	(0.20)	(0.20)	(0.20)
var(Openness)			
Constant	1.18 * **	1.19 * **	1.12 * **
	(0.25)	(0.23)	(0.27)
cov(Gender, Year of birth)			
Constant	0.03	0.03	0.03
	(0.03)	(0.03)	(0.03)
cov(Gender, Openness)			
Constant	−0.11 * **	−0.11 * **	−0.11 * **
	(0.02)	(0.02)	(0.02)
cov(Year of birth, Openness)			
Constant	−0.14	−0.13	−0.12
	(0.25)	(0.25)	(0.25)
var(e.intermediate sec)			
Constant		0.23 * **	
		(0.00)	
var(e.upper sec)			
Constant			0.24 * **
			(0.00)
N	3408	3408	3408

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Weighted data

Table L: SEM for Conscientiousness on attending a specific school type

	Lower or less vs other	Intermediate vs other	Upper vs other
main ←			
Gender	0.07 ∗ ∗∗	−0.01	−0.06 ∗ ∗∗
	(0.02)	(0.02)	(0.02)
Year of birth	−0.01 ∗ ∗	−0.00	0.01 ∗ ∗∗
	(0.00)	(0.00)	(0.00)
Conscientiousness	−0.00	0.01	−0.01
	(0.01)	(0.01)	(0.01)
Constant	13.07 ∗ ∗	7.03	−19.09 ∗ ∗∗
	(5.78)	(6.64)	(6.86)
kbf01 ←			
Conscientiousness	1.00	1.00	1.00
	.	.	.
Constant	6.97 ∗ ∗∗	6.98 ∗ ∗∗	6.98 ∗ ∗∗
	(0.14)	(0.14)	(0.14)
kbf07 ←			
Conscientiousness	0.69 ∗ ∗∗	0.69 ∗ ∗∗	0.68 ∗ ∗∗
	(0.07)	(0.07)	(0.07)
Constant	5.08 ∗ ∗∗	5.08 ∗ ∗∗	5.08 ∗ ∗∗
	(0.12)	(0.12)	(0.12)
kbf11 ←			
Conscientiousness	0.68 ∗ ∗∗	0.68 ∗ ∗∗	0.67 ∗ ∗∗
	(0.06)	(0.06)	(0.06)
Constant	7.00 ∗ ∗∗	7.01 ∗ ∗∗	7.01 ∗ ∗∗
	(0.10)	(0.10)	(0.10)
mean(Gender)			
Constant	0.51 ∗ ∗∗	0.51 ∗ ∗∗	0.51 ∗ ∗∗
	(0.01)	(0.01)	(0.01)
mean(Year of birth)			
Constant	1988.23 ∗ ∗∗	1988.23 ∗ ∗∗	1988.23 ∗ ∗∗
	(0.06)	(0.06)	(0.06)
var(e.kbf01)			
Constant	1.35 ∗ ∗∗	1.34 ∗ ∗∗	1.31 ∗ ∗∗
	(0.31)	(0.31)	(0.31)
var(e.kbf07)			
Constant	6.78 ∗ ∗∗	6.78 ∗ ∗∗	6.78 ∗ ∗∗
	(0.28)	(0.28)	(0.28)
var(e.kbf11)			
Constant	2.34 ∗ ∗∗	2.35 ∗ ∗∗	2.36 ∗ ∗∗
	(0.19)	(0.19)	(0.19)

var(e.lower sec)			
Constant	0.16 * **		
	(0.01)		
var(Gender)			
Constant	0.25 * **	0.25 * **	0.25 * **
	(0.00)	(0.00)	(0.00)
var(Year of birth)			
Constant	9.87 * **	9.87 * **	9.87 * **
	(0.20)	(0.20)	(0.20)
var(Conscientiousness)			
Constant	3.74 * **	3.75 * **	3.77 * **
	(0.37)	(0.36)	(0.37)
cov(Gender, Year of birth)			
Constant	0.03	0.03	0.03
	(0.03)	(0.03)	(0.03)
cov(Gender, Conscientiousness)			
Constant	−0.12 * **	−0.12 * **	−0.12 * **
	(0.03)	(0.03)	(0.03)
cov(Year of birth, Conscientiousness)			
Constant	0.17	0.15	0.15
	(0.38)	(0.38)	(0.38)
var(e.intermediate sec)			
Constant		0.23 * **	
		(0.00)	
var(e.upper sec)			
Constant			0.24 * **
			(0.00)
N	3408	3408	3408

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Weighted data

Table M: SEM for Extraversion on attending a specific school type

	Lower or less vs other	Intermediate vs other	Upper vs other
main ←			
Gender	0.07 ∗ ∗∗	−0.01	−0.05 ∗ ∗
	(0.02)	(0.02)	(0.02)
Year of birth	−0.01 ∗ ∗	−0.00	0.01 ∗ ∗∗
	(0.00)	(0.00)	(0.00)
Extraversion	−0.00	−0.01	0.01
	(0.01)	(0.01)	(0.01)
Constant	13.51 ∗ ∗	7.16	−19.63 ∗ ∗∗
	(5.80)	(6.63)	(6.86)
kbf02 ←			
Extraversion	1.00	1.00	1.00
	.	.	.
Constant	7.30 ∗ ∗∗	7.29 ∗ ∗∗	7.29 ∗ ∗∗
	(0.14)	(0.14)	(0.14)
kbf08 ←			
Extraversion	0.87 ∗ ∗∗	0.86 ∗ ∗∗	0.87 ∗ ∗∗
	(0.06)	(0.06)	(0.06)
Constant	7.08 ∗ ∗∗	7.08 ∗ ∗∗	7.08 ∗ ∗∗
	(0.12)	(0.12)	(0.12)
kbf12 ←			
Extraversion	0.83 ∗ ∗∗	0.83 ∗ ∗∗	0.83 ∗ ∗∗
	(0.06)	(0.06)	(0.06)
Constant	5.45 ∗ ∗∗	5.45 ∗ ∗∗	5.44 ∗ ∗∗
	(0.13)	(0.13)	(0.13)
mean(Gender)			
Constant	0.51 ∗ ∗∗	0.51 ∗ ∗∗	0.51 ∗ ∗∗
	(0.01)	(0.01)	(0.01)
mean(Year of birth)			
Constant	1988.24 ∗ ∗∗	1988.24 ∗ ∗∗	1988.24 ∗ ∗∗
	(0.06)	(0.06)	(0.06)
var(e.kbf02)			
Constant	1.73 ∗ ∗∗	1.72 ∗ ∗∗	1.73 ∗ ∗∗
	(0.27)	(0.27)	(0.27)
var(e.kbf08)			
Constant	2.73 ∗ ∗∗	2.74 ∗ ∗∗	2.73 ∗ ∗∗
	(0.26)	(0.26)	(0.26)
var(e.kbf12)			
Constant	5.68 ∗ ∗∗	5.68 ∗ ∗∗	5.68 ∗ ∗∗
	(0.28)	(0.28)	(0.28)

var(e.lower sec)			
Constant	0.16 * **		
	(0.01)		
var(Gender)			
Constant	0.25 * **	0.25 * **	0.25 * **
	(0.00)	(0.00)	(0.00)
var(Year of birth)			
Constant	9.88 * **	9.88 * **	9.88 * **
	(0.20)	(0.20)	(0.20)
var(Extraversion)			
Constant	3.97 * **	3.97 * **	3.97 * **
	(0.34)	(0.33)	(0.33)
cov(Gender, Year of birth)			
Constant	0.03	0.03	0.03
	(0.03)	(0.03)	(0.03)
cov(Gender, Extraversion)			
Constant	−0.14 * **	−0.14 * **	−0.14 * **
	(0.04)	(0.04)	(0.04)
cov(Year of birth, Extraversion)			
Constant	−0.46	−0.45	−0.44
	(0.39)	(0.39)	(0.39)
var(e.intermediate sec)			
Constant		0.23 * **	
		(0.00)	
var(e.upper sec)			
Constant			0.24 * **
			(0.00)
N	3408	3408	3408

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Weighted data

Table N: SEM for Agreeableness on attending a specific school type

	Lower or less vs other	Intermediate vs other	Upper vs other
main ←			
Gender	0.07 ∗ ∗∗	−0.01	−0.06 ∗ ∗
	(0.02)	(0.02)	(0.02)
Year of birth	−0.01 ∗ ∗	−0.00	0.01 ∗ ∗∗
	(0.00)	(0.00)	(0.00)
Agreeableness	−0.00	−0.00	0.01
	(0.02)	(0.02)	(0.02)
Constant	13.14 ∗ ∗	6.75	−18.89 ∗ ∗∗
	(5.73)	(6.62)	(6.81)
kbf03 ←			
Agreeableness	1.00	1.00	1.00
	.	.	.
Constant	6.01 ∗ ∗∗	6.01 ∗ ∗∗	6.01 ∗ ∗∗
	(0.10)	(0.10)	(0.10)
kbf06 ←			
Agreeableness	0.85 ∗ ∗∗	0.85 ∗ ∗∗	0.85 ∗ ∗∗
	(0.10)	(0.10)	(0.10)
Constant	7.80 ∗ ∗∗	7.80 ∗ ∗∗	7.80 ∗ ∗∗
	(0.08)	(0.08)	(0.08)
kbf13 ←			
Agreeableness	1.67 ∗ ∗∗	1.67 ∗ ∗∗	1.66 ∗ ∗∗
	(0.32)	(0.31)	(0.32)
Constant	7.96 ∗ ∗∗	7.96 ∗ ∗∗	7.96 ∗ ∗∗
	(0.11)	(0.11)	(0.11)
mean(Gender)			
Constant	0.51 ∗ ∗∗	0.51 ∗ ∗∗	0.51 ∗ ∗∗
	(0.01)	(0.01)	(0.01)
mean(Year of birth)			
Constant	1988.23 ∗ ∗∗	1988.23 ∗ ∗∗	1988.23 ∗ ∗∗
	(0.06)	(0.06)	(0.06)
var(e.kbf03)			
Constant	6.09 ∗ ∗∗	6.09 ∗ ∗∗	6.08 ∗ ∗∗
	(0.29)	(0.28)	(0.29)
var(e.kbf06)			
Constant	3.30 ∗ ∗∗	3.30 ∗ ∗∗	3.30 ∗ ∗∗
	(0.21)	(0.20)	(0.21)
var(e.kbf13)			
Constant	0.72	0.71	0.73

	(0.48)	(0.46)	(0.47)
var(e.lower sec)			
Constant	0.16 * **		
	(0.01)		
var(Gender)			
Constant	0.25 * **	0.25 * **	0.25 * **
	(0.00)	(0.00)	(0.00)
var(Year of birth)			
Constant	9.87 * **	9.87 * **	9.87 * **
	(0.20)	(0.20)	(0.20)
var(Agreeableness)			
Constant	0.96 * **	0.96 * **	0.97 * **
	(0.24)	(0.23)	(0.24)
cov(Gender, Year of birth)			
Constant	0.03	0.03	0.03
	(0.03)	(0.03)	(0.03)
cov(Gender, Agreeableness)			
Constant	−0.08 * **	−0.08 * **	−0.08 * **
	(0.02)	(0.02)	(0.02)
cov(Year of birth, Agreeableness)			
Constant	−0.06	−0.06	−0.06
	(0.20)	(0.20)	(0.20)
var(e.intermediate sec)			
Constant		0.23 * **	
		(0.00)	
var(e.upper sec)			
Constant			0.24 * **
			(0.00)
N	3408	3408	3408

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Weighted data

Table O: SEM for Neuroticism on attending a specific school type

	Lower or less vs other	Intermediate vs other	Upper vs other
main ←			
Gender	0.09 ∗ ∗∗	−0.01	−0.07 ∗ ∗∗
	(0.02)	(0.02)	(0.02)
Year of birth	−0.01 ∗ ∗	−0.00	0.01 ∗ ∗∗
	(0.00)	(0.00)	(0.00)
Neuroticism	0.02	0.00	−0.02
	(0.01)	(0.01)	(0.02)
Constant	12.64 ∗ ∗	6.67	−18.30 ∗ ∗∗
	(5.96)	(6.62)	(6.93)
kbf05 ←			
Neuroticism	1.00	1.00	1.00
	.	.	.
Constant	5.74 ∗ ∗∗	5.74 ∗ ∗∗	5.74 ∗ ∗∗
	(0.13)	(0.13)	(0.13)
kbf10 ←			
Neuroticism	1.31 ∗ ∗∗	1.29 ∗ ∗∗	1.31 ∗ ∗∗
	(0.19)	(0.18)	(0.19)
Constant	4.95 ∗ ∗∗	4.95 ∗ ∗∗	4.96 ∗ ∗∗
	(0.15)	(0.15)	(0.16)
kbf15 ←			
Neuroticism	0.81 ∗ ∗∗	0.80 ∗ ∗∗	0.80 ∗ ∗∗
	(0.11)	(0.11)	(0.11)
Constant	4.03 ∗ ∗∗	4.03 ∗ ∗∗	4.03 ∗ ∗∗
	(0.11)	(0.11)	(0.11)
mean(Gender)			
Constant	0.51 ∗ ∗∗	0.51 ∗ ∗∗	0.51 ∗ ∗∗
	(0.01)	(0.01)	(0.01)
mean(Year of birth)			
Constant	1988.23 ∗ ∗∗	1988.23 ∗ ∗∗	1988.23 ∗ ∗∗
	(0.06)	(0.06)	(0.06)
var(e.kbf05)			
Constant	5.92 ∗ ∗∗	5.88 ∗ ∗∗	5.91 ∗ ∗∗
	(0.37)	(0.37)	(0.38)
var(e.kbf10)			
Constant	4.40 ∗ ∗∗	4.44 ∗ ∗∗	4.39 ∗ ∗∗
	(0.49)	(0.49)	(0.50)
var(e.kbf15)			
Constant	4.55 ∗ ∗∗	4.55 ∗ ∗∗	4.56 ∗ ∗∗

	(0.24)	(0.24)	(0.24)
var(e.lower sec)			
Constant	0.16 * **		
	(0.01)		
var(Gender)			
Constant	0.25 * **	0.25 * **	0.25 * **
	(0.00)	(0.00)	(0.00)
var(Year of birth)			
Constant	9.87 * **	9.87 * **	9.87 * **
	(0.20)	(0.20)	(0.20)
var(Neuroticism)			
Constant	1.94 * **	1.97 * **	1.95 * **
	(0.35)	(0.36)	(0.36)
cov(Gender, Year of birth)			
Constant	0.03	0.03	0.03
	(0.03)	(0.03)	(0.03)
cov(Gender, Neuroticism)			
Constant	−0.17 * **	−0.18 * **	−0.17 * **
	(0.04)	(0.04)	(0.04)
cov(Year of birth, Neuroticism)			
Constant	−0.11	−0.11	−0.12
	(0.32)	(0.33)	(0.33)
var(e.intermediate sec)			
Constant		0.23 * **	
		(0.00)	
var(e.upper sec)			
Constant			0.24 * **
			(0.00)
N	3408	3408	3408

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Weighted data

Table P: SEM for Locus of Control on attending a specific school type, full model

	Lower or less vs other	Intermediate vs other	Upper vs other
kl01 ←			
Locus of Control	1.00	1.00	1.00
	.	.	.
Constant	7.81 ∗ ∗∗	7.81 ∗ ∗∗	7.81 ∗ ∗∗
	(0.05)	(0.05)	(0.05)
kl03 ←			
Locus of Control	2.17 ∗ ∗∗	2.14 ∗ ∗∗	2.19 ∗ ∗∗
	(0.33)	(0.33)	(0.34)
Constant	6.48 ∗ ∗∗	6.48 ∗ ∗∗	6.48 ∗ ∗∗
	(0.05)	(0.05)	(0.05)
kl04 ←			
Locus of Control	2.92 ∗ ∗∗	2.93 ∗ ∗∗	2.94 ∗ ∗∗
	(0.41)	(0.41)	(0.42)
Constant	6.90 ∗ ∗∗	6.90 ∗ ∗∗	6.90 ∗ ∗∗
	(0.05)	(0.05)	(0.05)
kl05 ←			
Locus of Control	−0.12	−0.12	−0.13
	(0.15)	(0.15)	(0.15)
Constant	7.71 ∗ ∗∗	7.71 ∗ ∗∗	7.71 ∗ ∗∗
	(0.05)	(0.05)	(0.05)
kl06 ←			
Locus of Control	2.40 ∗ ∗∗	2.45 ∗ ∗∗	2.45 ∗ ∗∗
	(0.37)	(0.39)	(0.39)
Constant	6.19 ∗ ∗∗	6.19 ∗ ∗∗	6.19 ∗ ∗∗
	(0.05)	(0.05)	(0.05)
kl07 ←			
Locus of Control	1.69 ∗ ∗∗	1.73 ∗ ∗∗	1.71 ∗ ∗∗
	(0.29)	(0.30)	(0.29)
Constant	5.17 ∗ ∗∗	5.17 ∗ ∗∗	5.17 ∗ ∗∗
	(0.05)	(0.05)	(0.05)
kl08 ←			
Locus of Control	0.67 ∗ ∗∗	0.66 ∗ ∗∗	0.68 ∗ ∗∗
	(0.20)	(0.20)	(0.20)
Constant	4.11 ∗ ∗∗	4.11 ∗ ∗∗	4.11 ∗ ∗∗
	(0.05)	(0.05)	(0.05)
kl09 ←			
Locus of Control	2.56 ∗ ∗∗	2.58 ∗ ∗∗	2.62 ∗ ∗∗
	(0.33)	(0.34)	(0.34)
Constant	7.51 ∗ ∗∗	7.51 ∗ ∗∗	7.51 ∗ ∗∗
	(0.04)	(0.04)	(0.04)

lower sec ←			
Locus of Control	$-0.13 * **$		
	(0.03)		
Openness	$-0.05 * *$		
	(0.02)		
Conscientiousness	0.01		
	(0.01)		
Extraversion	0.01		
	(0.01)		
Agreeableness	0.01		
	(0.02)		
Neuroticism	0.01		
	(0.02)		
Constant	$0.21 * **$		
	(0.01)		
kbf04 ←			
Openness	1.00	1.00	1.00
	.	.	.
Constant	$6.49 * **$	$6.49 * **$	$6.48 * **$
	(0.06)	(0.06)	(0.06)
kbf09 ←			
Openness	$1.30 * **$	$1.24 * **$	$1.35 * **$
	(0.20)	(0.17)	(0.21)
Constant	$4.78 * **$	$4.79 * **$	$4.77 * **$
	(0.09)	(0.09)	(0.09)
kbf14 ←			
Openness	$1.22 * **$	$1.24 * **$	$1.23 * **$
	(0.15)	(0.17)	(0.14)
Constant	$7.12 * **$	$7.13 * **$	$7.12 * **$
	(0.07)	(0.07)	(0.07)
kbf01 ←			
Conscientiousness	1.00	1.00	1.00
	.	.	.
Constant	$7.02 * **$	$7.02 * **$	$7.03 * **$
	(0.07)	(0.07)	(0.07)
kbf07 ←			
Conscientiousness	$0.67 * **$	$0.67 * **$	$0.67 * **$
	(0.07)	(0.07)	(0.07)
Constant	$5.11 * **$	$5.11 * **$	$5.12 * **$
	(0.09)	(0.09)	(0.09)
kbf11 ←			
Conscientiousness	$0.66 * **$	$0.66 * **$	$0.65 * **$
	(0.06)	(0.06)	(0.06)

Constant	7.05 ∗ ∗	7.05 ∗ ∗	7.06 ∗ ∗
	(0.06)	(0.06)	(0.06)
kbf02 ←			
Extraversion	1.00	1.00	1.00
	.	.	.
Constant	7.16 ∗ ∗	7.15 ∗ ∗	7.16 ∗ ∗
	(0.07)	(0.07)	(0.07)
kbf08 ←			
Extraversion	0.90 ∗ ∗	0.90 ∗ ∗	0.90 ∗ ∗
	(0.06)	(0.06)	(0.06)
Constant	6.96 ∗ ∗	6.96 ∗ ∗	6.96 ∗ ∗
	(0.07)	(0.07)	(0.07)
kbf12 ←			
Extraversion	0.86 ∗ ∗	0.86 ∗ ∗	0.86 ∗ ∗
	(0.06)	(0.06)	(0.06)
Constant	5.33 ∗ ∗	5.33 ∗ ∗	5.33 ∗ ∗
	(0.09)	(0.09)	(0.09)
kbf03 ←			
Agreeableness	1.00	1.00	1.00
	.	.	.
Constant	6.01 ∗ ∗	6.01 ∗ ∗	6.01 ∗ ∗
	(0.08)	(0.08)	(0.08)
kbf06 ←			
Agreeableness	0.85 ∗ ∗	0.85 ∗ ∗	0.85 ∗ ∗
	(0.10)	(0.10)	(0.10)
Constant	7.79 ∗ ∗	7.78 ∗ ∗	7.79 ∗ ∗
	(0.06)	(0.06)	(0.06)
kbf13 ←			
Agreeableness	1.70 ∗ ∗	1.67 ∗ ∗	1.68 ∗ ∗
	(0.38)	(0.36)	(0.38)
Constant	7.93 ∗ ∗	7.93 ∗ ∗	7.93 ∗ ∗
	(0.06)	(0.05)	(0.05)
kbf05 ←			
Neuroticism	1.00	1.00	1.00
	.	.	.
Constant	5.70 ∗ ∗	5.70 ∗ ∗	5.70 ∗ ∗
	(0.08)	(0.08)	(0.08)
kbf10 ←			
Neuroticism	1.57 ∗ ∗	1.56 ∗ ∗	1.58 ∗ ∗
	(0.25)	(0.25)	(0.26)
Constant	4.90 ∗ ∗	4.90 ∗ ∗	4.90 ∗ ∗
	(0.08)	(0.08)	(0.08)
kbf15 ←			
Neuroticism	0.85 ∗ ∗	0.85 ∗ ∗	0.85 ∗ ∗
	(0.10)	(0.10)	(0.10)
Constant	3.99 ∗ ∗	3.99 ∗ ∗	3.99 ∗ ∗

	(0.07)	(0.07)	(0.07)
var(e.kl01)			
Constant	5.60 ∗ ∗∗	5.60 ∗ ∗∗	5.60 ∗ ∗∗
	(0.14)	(0.14)	(0.14)
var(e.kl03)			
Constant	4.88 ∗ ∗∗	4.92 ∗ ∗∗	4.89 ∗ ∗∗
	(0.19)	(0.19)	(0.19)
var(e.kl04)			
Constant	4.08 ∗ ∗∗	4.09 ∗ ∗∗	4.11 ∗ ∗∗
	(0.21)	(0.21)	(0.21)
var(e.kl05)			
Constant	5.79 ∗ ∗∗	5.79 ∗ ∗∗	5.79 ∗ ∗∗
	(0.12)	(0.12)	(0.12)
var(e.kl06)			
Constant	5.22 ∗ ∗∗	5.18 ∗ ∗∗	5.21 ∗ ∗∗
	(0.21)	(0.21)	(0.21)
var(e.kl07)			
Constant	5.30 ∗ ∗∗	5.27 ∗ ∗∗	5.30 ∗ ∗∗
	(0.18)	(0.18)	(0.18)
var(e.kl08)			
Constant	5.81 ∗ ∗∗	5.81 ∗ ∗∗	5.81 ∗ ∗∗
	(0.15)	(0.15)	(0.15)
var(e.kl09)			
Constant	3.25 ∗ ∗∗	3.24 ∗ ∗∗	3.22 ∗ ∗∗
	(0.20)	(0.20)	(0.20)
var(e.lower sec)			
Constant	0.16 ∗ ∗∗		
	(0.01)		
var(e.kbf04)			
Constant	3.28 ∗ ∗∗	3.26 ∗ ∗∗	3.31 ∗ ∗∗
	(0.24)	(0.25)	(0.25)
var(e.kbf09)			
Constant	7.01 ∗ ∗∗	7.19 ∗ ∗∗	6.91 ∗ ∗∗
	(0.46)	(0.41)	(0.49)
var(e.kbf14)			
Constant	3.94 ∗ ∗∗	3.84 ∗ ∗∗	3.97 ∗ ∗∗
	(0.32)	(0.33)	(0.33)
var(e.kbf01)			
Constant	1.24 ∗ ∗∗	1.25 ∗ ∗∗	1.21 ∗ ∗∗
	(0.34)	(0.33)	(0.34)
var(e.kbf07)			
Constant	6.84 ∗ ∗∗	6.84 ∗ ∗∗	6.84 ∗ ∗∗
	(0.28)	(0.28)	(0.28)
var(e.kbf11)			
Constant	2.33 ∗ ∗∗	2.32 ∗ ∗∗	2.34 ∗ ∗∗
	(0.20)	(0.20)	(0.20)

var(e.kbf02)			
Constant	1.90 ∗ ∗∗	1.90 ∗ ∗∗	1.90 ∗ ∗∗
	(0.24)	(0.25)	(0.24)
var(e.kbf08)			
Constant	2.63 ∗ ∗∗	2.63 ∗ ∗∗	2.63 ∗ ∗∗
	(0.25)	(0.24)	(0.24)
var(e.kbf12)			
Constant	5.59 ∗ ∗∗	5.59 ∗ ∗∗	5.59 ∗ ∗∗
	(0.28)	(0.28)	(0.28)
var(e.kbf03)			
Constant	6.04 ∗ ∗∗	6.02 ∗ ∗∗	6.03 ∗ ∗∗
	(0.30)	(0.30)	(0.30)
var(e.kbf06)			
Constant	3.27 ∗ ∗∗	3.25 ∗ ∗∗	3.26 ∗ ∗∗
	(0.22)	(0.22)	(0.22)
var(e.kbf13)			
Constant	0.71	0.76	0.74
	(0.56)	(0.54)	(0.57)
var(e.kbf05)			
Constant	6.23 ∗ ∗∗	6.22 ∗ ∗∗	6.24 ∗ ∗∗
	(0.35)	(0.35)	(0.35)
var(e.kbf10)			
Constant	3.82 ∗ ∗∗	3.83 ∗ ∗∗	3.78 ∗ ∗∗
	(0.67)	(0.66)	(0.69)
var(e.kbf15)			
Constant	4.60 ∗ ∗∗	4.60 ∗ ∗∗	4.61 ∗ ∗∗
	(0.25)	(0.25)	(0.26)
var(Locus of Control)			
Constant	0.27 ∗ ∗∗	0.26 ∗ ∗∗	0.26 ∗ ∗∗
	(0.07)	(0.07)	(0.07)
var(Openness)			
Constant	1.30 ∗ ∗∗	1.32 ∗ ∗∗	1.26 ∗ ∗∗
	(0.23)	(0.23)	(0.23)
var(Conscientiousness)			
Constant	3.85 ∗ ∗∗	3.84 ∗ ∗∗	3.88 ∗ ∗∗
	(0.39)	(0.38)	(0.39)
var(Extraversion)			
Constant	3.79 ∗ ∗∗	3.79 ∗ ∗∗	3.78 ∗ ∗∗
	(0.30)	(0.31)	(0.31)
var(Agreeableness)			
Constant	0.93 ∗ ∗∗	0.94 ∗ ∗∗	0.93 ∗ ∗∗
	(0.25)	(0.25)	(0.25)
var(Neuroticism)			
Constant	1.59 ∗ ∗∗	1.60 ∗ ∗∗	1.59 ∗ ∗∗
	(0.32)	(0.32)	(0.32)

intermediate sec ←

Locus of Control		−0.01	0.14 ∗ ∗∗
		(0.03)	(0.04)
Openness		−0.03	0.08 ∗ ∗∗
		(0.02)	(0.03)
Conscientiousness		0.01	−0.02∗
		(0.01)	(0.01)
Extraversion		0.00	−0.01
		(0.01)	(0.01)
Agreeableness		−0.00	−0.01
		(0.02)	(0.02)
Neuroticism		0.01	−0.01
		(0.02)	(0.02)
Constant		0.36 ∗ ∗∗	0.44 ∗ ∗∗
		(0.01)	(0.01)
var(e.Type of school)			
Constant		0.23 ∗ ∗∗	0.23 ∗ ∗∗
		(0.00)	(0.01)
N	3403	3403	3403

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Weighted data

Table Q: SEM for Locus of Control on maths grades 1'not sufficient' to 6'very good', by level of secondary schooling

	(1) Lower	(2) Intermediate	(3) Upper
Maths grade ←			
Gender	0.18∗	0.08	−0.05
	(0.10)	(0.07)	(0.07)
Year of birth	0.01	−0.00	0.01
	(0.02)	(0.01)	(0.01)
Locus of control	0.24	0.32∗	0.19∗
	(0.15)	(0.16)	(0.12)
Constant	−19.58	6.81	−19.08
	(31.35)	(22.54)	(23.68)
kl01 ←			
Locus of Control	1.00	1.00	1.00
	.	.	.
Constant	7.59 ∗ ∗∗	7.91 ∗ ∗∗	7.85 ∗ ∗∗
	(0.13)	(0.09)	(0.07)
kl03 ←			
Locus of Control	2.29∗	2.63 ∗ ∗∗	2.04 ∗ ∗∗
	(1.38)	(0.85)	(0.58)
Constant	5.85 ∗ ∗∗	6.50 ∗ ∗∗	6.89 ∗ ∗∗
	(0.13)	(0.09)	(0.07)
kl04 ←			
Locus of Control	3.05 ∗ ∗	3.41 ∗ ∗∗	2.95 ∗ ∗∗
	(1.49)	(1.11)	(0.70)
Constant	6.47 ∗ ∗∗	7.01 ∗ ∗∗	7.13 ∗ ∗∗
	(0.13)	(0.09)	(0.08)
kl05 ←			
Locus of Control	0.20	−0.23	−0.54
	(0.46)	(0.36)	(0.35)
Constant	7.78 ∗ ∗∗	7.85 ∗ ∗∗	7.49 ∗ ∗∗
	(0.12)	(0.08)	(0.08)
kl06 ←			
Locus of Control	2.18∗	3.44 ∗ ∗∗	2.90 ∗ ∗∗
	(1.24)	(1.20)	(0.81)
Constant	6.09 ∗ ∗∗	6.22 ∗ ∗∗	6.31 ∗ ∗∗
	(0.13)	(0.09)	(0.09)
kl07 ←			
Locus of Control	1.82∗	2.32 ∗ ∗∗	2.01 ∗ ∗∗
	(1.10)	(0.84)	(0.62)
Constant	5.20 ∗ ∗∗	5.29 ∗ ∗∗	5.08 ∗ ∗∗

	(0.13)	(0.09)	(0.08)
kl08 ←			
Locus of Control	0.09	0.92∗	1.15 ∗ ∗
	(0.62)	(0.48)	(0.48)
Constant	3.85 ∗ ∗∗	4.10 ∗ ∗∗	4.32 ∗ ∗∗
	(0.13)	(0.09)	(0.08)
kl09 ←			
Locus of Control	2.83 ∗ ∗	3.04 ∗ ∗∗	2.29 ∗ ∗∗
	(1.12)	(0.95)	(0.51)
Constant	7.19 ∗ ∗∗	7.45 ∗ ∗∗	7.84 ∗ ∗∗
	(0.11)	(0.08)	(0.07)
mean(Gender)			
Constant	0.59 ∗ ∗∗	0.49 ∗ ∗∗	0.47 ∗ ∗∗
	(0.02)	(0.02)	(0.02)
mean(Year of birth)			
Constant	1987.94 ∗ ∗∗	1988.15 ∗ ∗∗	1988.45 ∗ ∗∗
	(0.16)	(0.12)	(0.10)
var(e.kl01)			
Constant	6.55 ∗ ∗∗	5.70 ∗ ∗∗	4.93 ∗ ∗∗
	(0.38)	(0.26)	(0.19)
var(e.kl03)			
Constant	6.12 ∗ ∗∗	4.90 ∗ ∗∗	3.77 ∗ ∗∗
	(0.63)	(0.33)	(0.23)
var(e.kl04)			
Constant	5.12 ∗ ∗∗	3.88 ∗ ∗∗	3.74 ∗ ∗∗
	(0.64)	(0.37)	(0.30)
var(e.kl05)			
Constant	6.38 ∗ ∗∗	5.51 ∗ ∗∗	5.52 ∗ ∗∗
	(0.34)	(0.19)	(0.18)
var(e.kl06)			
Constant	5.91 ∗ ∗∗	4.57 ∗ ∗∗	4.89 ∗ ∗∗
	(0.61)	(0.38)	(0.33)
var(e.kl07)			
Constant	5.56 ∗ ∗∗	4.96 ∗ ∗∗	4.92 ∗ ∗∗
	(0.52)	(0.34)	(0.28)
var(e.kl08)			
Constant	6.66 ∗ ∗∗	5.57 ∗ ∗∗	5.30 ∗ ∗∗
	(0.34)	(0.27)	(0.25)
var(e.kl09)			
Constant	3.67 ∗ ∗∗	3.56 ∗ ∗∗	2.83 ∗ ∗∗
	(0.69)	(0.37)	(0.29)
var(e.Maths grade)			
Constant	0.97 ∗ ∗∗	0.91 ∗ ∗∗	1.14 ∗ ∗∗
	(0.06)	(0.04)	(0.04)
var(Gender)			

Constant	0.24 * **	0.25 * **	0.25 * **
	(0.00)	(0.00)	(0.00)
var(Year of birth)			
Constant	9.63 * **	10.01 * **	9.71 * **
	(0.54)	(0.34)	(0.31)
var(Locus of Control)			
Constant	0.27	0.16	0.21*
	(0.26)	(0.10)	(0.11)
cov(Gender, Year of birth)			
Constant	0.00	0.03	0.10 * *
	(0.08)	(0.06)	(0.05)
cov(Gender, Locus of Control)			
Constant	0.01	0.02	0.03 * *
	(0.02)	(0.01)	(0.01)
cov(Year of birth, Locus of Control)			
Constant	−0.22*	−0.26 * **	−0.32 * **
	(0.12)	(0.09)	(0.08)
N	596	1045	1293

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Weighted data

Table R: SEM for Locus of Control on Openness to Experience 1'not sufficient' to 6'very good', by level of secondary schooling

	(1) Lower	(2) Intermediate	(3) Upper
Maths grade ←			
Gender	0.16	0.09	−0.05
	(0.10)	(0.07)	(0.07)
Year of birth	0.01	−0.01	0.00
	(0.02)	(0.01)	(0.01)
Openness	−0.06	−0.01	−0.07
	(0.05)	(0.09)	(0.07)
Constant	−22.17	25.05	−1.79
	(34.19)	(23.20)	(23.20)
kbf04 ←			
Openness	1.00	1.00	1.00
	.	.	.
Constant	6.15 ∗ ∗∗	6.61 ∗ ∗∗	6.65 ∗ ∗∗
	(0.38)	(0.17)	(0.14)
kbf09 ←			
Openness	0.43	1.57∗	1.60 ∗ ∗∗
	(0.27)	(0.87)	(0.32)
Constant	3.79 ∗ ∗∗	4.83 ∗ ∗∗	5.55 ∗ ∗∗
	(0.30)	(0.31)	(0.21)
kbf14 ←			
Openness	0.41	1.27 ∗ ∗∗	1.64 ∗ ∗∗
	(0.28)	(0.34)	(0.25)
Constant	7.04 ∗ ∗∗	7.24 ∗ ∗∗	7.45 ∗ ∗∗
	(0.25)	(0.21)	(0.19)
mean(Gender)			
Constant	0.59 ∗ ∗∗	0.49 ∗ ∗∗	0.47 ∗ ∗∗
	(0.02)	(0.02)	(0.02)
mean(Year of birth)			
Constant	1987.96 ∗ ∗∗	1988.17 ∗ ∗∗	1988.46 ∗ ∗∗
	(0.16)	(0.12)	(0.10)
var(e.kbf04)			
Constant	0.53	3.44 ∗ ∗∗	3.13 ∗ ∗∗
	(3.21)	(0.44)	(0.32)
var(e.kbf09)			
Constant	8.04 ∗ ∗∗	6.45 ∗ ∗∗	6.18 ∗ ∗∗
	(0.89)	(1.27)	(0.73)
var(e.kbf14)			

Constant	5.45 ∗ ∗∗	4.14 ∗ ∗∗	2.93 ∗ ∗∗
	(0.75)	(0.68)	(0.58)
var(e.Maths grade)			
Constant	0.97 ∗ ∗∗	0.93 ∗ ∗∗	1.14 ∗ ∗∗
	(0.06)	(0.04)	(0.04)
var(Gender)			
Constant	0.24 ∗ ∗∗	0.25 ∗ ∗∗	0.25 ∗ ∗∗
	(0.00)	(0.00)	(0.00)
var(Year of birth)			
Constant	9.67 ∗ ∗∗	10.03 ∗ ∗∗	9.71 ∗ ∗∗
	(0.54)	(0.34)	(0.31)
var(Openness)			
Constant	5.04	0.82∗	1.08 ∗ ∗∗
	(3.29)	(0.44)	(0.27)
cov(Gender, Year of birth)			
Constant	−0.00	0.03	0.10 ∗ ∗
	(0.08)	(0.06)	(0.05)
cov(Gender, Openness)			
Constant	−0.07	−0.06	−0.11 ∗ ∗∗
	(0.11)	(0.05)	(0.03)
cov(Year of birth, Openness)			
Constant	0.98	−0.50	−0.33
	(1.01)	(0.42)	(0.34)
N	596	1045	1293

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Weighted data

Table S: SEM for Conscientiousness on maths grades 1'not sufficient' to 6'very good', by level of secondary schooling

	(1) Lower	(2) Intermediate	(3) Upper
Maths grade ←			
Gender	0.18∗	0.16 ∗ ∗	0.10
	(0.10)	(0.08)	(0.07)
Year of birth	0.01	−0.02	0.01
	(0.02)	(0.01)	(0.02)
Conscientiousness	0.02	0.13 ∗ ∗∗	0.19 ∗ ∗∗
	(0.04)	(0.04)	(0.03)
Constant	−8.17	44.45∗	−8.81
	(32.39)	(26.90)	(30.45)
kbf01 ←			
Conscientiousness	1.00	1.00	1.00
	.	.	.
Constant	6.83 ∗ ∗∗	6.90 ∗ ∗∗	6.95 ∗ ∗∗
	(0.37)	(0.24)	(0.20)
kbf07 ←			
Conscientiousness	0.55 ∗ ∗∗	0.74 ∗ ∗∗	0.84 ∗ ∗∗
	(0.20)	(0.13)	(0.09)
Constant	5.22 ∗ ∗∗	4.92 ∗ ∗∗	4.87 ∗ ∗∗
	(0.29)	(0.21)	(0.20)
kbf11 ←			
Conscientiousness	0.65 ∗ ∗∗	0.79 ∗ ∗∗	0.73 ∗ ∗∗
	(0.23)	(0.11)	(0.05)
Constant	6.62 ∗ ∗∗	6.92 ∗ ∗∗	7.18 ∗ ∗∗
	(0.31)	(0.20)	(0.15)
mean(Gender)			
Constant	0.59 ∗ ∗∗	0.49 ∗ ∗∗	0.47 ∗ ∗∗
	(0.02)	(0.02)	(0.02)
mean(Year of birth)			
Constant	1987.96 ∗ ∗∗	1988.17 ∗ ∗∗	1988.46 ∗ ∗∗
	(0.16)	(0.12)	(0.10)
var(e.kbf01)			
Constant	1.21	1.94 ∗ ∗∗	1.48 ∗ ∗∗
	(1.40)	(0.40)	(0.30)
var(e.kbf07)			
Constant	7.07 ∗ ∗∗	6.14 ∗ ∗∗	6.33 ∗ ∗∗
	(0.71)	(0.49)	(0.42)
var(e.kbf11)			

Constant	3.17 * **	1.81 * **	1.79 * **
	(0.76)	(0.30)	(0.20)
var(e.Maths grade)			
Constant	0.98 * **	0.88 * **	1.00 * **
	(0.06)	(0.05)	(0.05)
var(Gender)			
Constant	0.24 * **	0.25 * **	0.25 * **
	(0.00)	(0.00)	(0.00)
var(Year of birth)			
Constant	9.68 * **	10.03 * **	9.71 * **
	(0.54)	(0.34)	(0.31)
var(Conscientiousness)			
Constant	4.16 * **	2.87 * **	3.82 * **
	(1.42)	(0.52)	(0.44)
cov(Gender, Year of birth)			
Constant	−0.00	0.03	0.10 * *
	(0.08)	(0.06)	(0.05)
cov(Gender, Conscientiousness)			
Constant	−0.00	−0.12 * *	−0.16 * **
	(0.09)	(0.05)	(0.05)
cov(Year of birth, Conscientiousness)			
Constant	0.61	0.77	−0.13
	(1.07)	(0.61)	(0.57)
N	596	1045	1293

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Weighted data

Table T: SEM for Extraversion on maths grades 1'not sufficient' to 6'very good', by level of secondary schooling

	(1) Lower	(2) Intermediate	(3) Upper
Maths grade ←			
Gender	0.13	0.08	−0.04
	(0.11)	(0.07)	(0.07)
Year of birth	0.02	−0.01	0.00
	(0.02)	(0.01)	(0.01)
Extraversion	−0.11 ∗ ∗	−0.02	−0.07 ∗ ∗
	(0.05)	(0.03)	(0.03)
Constant	−37.29	24.50	0.33
	(38.92)	(21.88)	(23.42)
kbf02 ←			
Extraversion	1.00	1.00	1.00
	.	.	.
Constant	6.76 ∗ ∗∗	7.17 ∗ ∗∗	7.37 ∗ ∗∗
	(0.42)	(0.23)	(0.21)
kbf08 ←			
Extraversion	0.77 ∗ ∗∗	0.71 ∗ ∗∗	0.97 ∗ ∗∗
	(0.17)	(0.11)	(0.08)
Constant	6.49 ∗ ∗∗	7.00 ∗ ∗∗	7.17 ∗ ∗∗
	(0.35)	(0.19)	(0.20)
kbf12 ←			
Extraversion	0.70 ∗ ∗∗	0.67 ∗ ∗∗	0.96 ∗ ∗∗
	(0.19)	(0.11)	(0.08)
Constant	5.17 ∗ ∗∗	5.34 ∗ ∗∗	5.49 ∗ ∗∗
	(0.34)	(0.20)	(0.21)
mean(Gender)			
Constant	0.58 ∗ ∗∗	0.49 ∗ ∗∗	0.47 ∗ ∗∗
	(0.02)	(0.02)	(0.02)
mean(Year of birth)			
Constant	1987.97 ∗ ∗∗	1988.17 ∗ ∗∗	1988.46 ∗ ∗∗
	(0.16)	(0.12)	(0.10)
var(e.kbf02)			
Constant	2.32 ∗ ∗	0.86	1.87 ∗ ∗∗
	(1.03)	(0.57)	(0.30)
var(e.kbf08)			
Constant	3.78 ∗ ∗∗	3.13 ∗ ∗∗	1.96 ∗ ∗∗
	(1.00)	(0.45)	(0.28)
var(e.kbf12)			

Constant	7.07 ∗ ∗∗	6.10 ∗ ∗∗	4.84 ∗ ∗∗
	(0.85)	(0.50)	(0.40)
var(e.Maths grade)			
Constant	0.92 ∗ ∗∗	0.93 ∗ ∗∗	1.12 ∗ ∗∗
	(0.07)	(0.04)	(0.04)
var(Gender)			
Constant	0.24 ∗ ∗∗	0.25 ∗ ∗∗	0.25 ∗ ∗∗
	(0.00)	(0.00)	(0.00)
var(Year of birth)			
Constant	9.72 ∗ ∗∗	10.05 ∗ ∗∗	9.71 ∗ ∗∗
	(0.53)	(0.34)	(0.31)
var(Extraversion)			
Constant	4.36 ∗ ∗∗	4.08 ∗ ∗∗	3.90 ∗ ∗∗
	(1.18)	(0.65)	(0.45)
cov(Gender, Year of birth)			
Constant	−0.00	0.03	0.10 ∗ ∗
	(0.08)	(0.06)	(0.05)
cov(Gender, Extraversion)			
Constant	−0.13	−0.20 ∗ ∗∗	−0.05
	(0.09)	(0.06)	(0.06)
cov(Year of birth, Extraversion)			
Constant	1.07	−0.25	−0.45
	(1.04)	(0.67)	(0.62)
N	596	1045	1293

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Weighted data

Table U: SEM for Agreeableness on maths grades 1'not sufficient' to 6'very good', by level of secondary schooling

	(1) Lower	(2) Intermediate	(3) Upper
Maths grade ←			
Gender	0.21 ∗ ∗	0.11	−0.02
	(0.10)	(0.07)	(0.07)
Year of birth	0.01	−0.01	0.01
	(0.02)	(0.01)	(0.01)
Agreeableness	0.07	0.04	0.03
	(0.07)	(0.06)	(0.06)
Constant	−15.98	24.90	−6.43
	(34.61)	(22.07)	(22.20)
kbf03 ←			
Agreeableness	1.00	1.00	1.00
	.	.	.
Constant	5.77 ∗ ∗∗	5.89 ∗ ∗∗	6.16 ∗ ∗∗
	(0.39)	(0.17)	(0.13)
kbf06 ←			
Agreeableness	0.69 ∗ ∗∗	0.94 ∗ ∗∗	1.00 ∗ ∗∗
	(0.17)	(0.17)	(0.19)
Constant	7.77 ∗ ∗∗	7.75 ∗ ∗∗	7.85 ∗ ∗∗
	(0.28)	(0.13)	(0.11)
kbf13 ←			
Agreeableness	0.94 ∗ ∗∗	2.15 ∗ ∗∗	2.12 ∗ ∗∗
	(0.33)	(0.46)	(0.66)
Constant	7.98 ∗ ∗∗	7.81 ∗ ∗∗	7.95 ∗ ∗∗
	(0.32)	(0.19)	(0.16)
mean(Gender)			
Constant	0.59 ∗ ∗∗	0.49 ∗ ∗∗	0.47 ∗ ∗∗
	(0.02)	(0.02)	(0.02)
mean(Year of birth)			
Constant	1987.96 ∗ ∗∗	1988.17 ∗ ∗∗	1988.46 ∗ ∗∗
	(0.16)	(0.12)	(0.10)
var(e.kbf03)			
Constant	6.46 ∗ ∗∗	6.11 ∗ ∗∗	5.75 ∗ ∗∗
	(1.03)	(0.44)	(0.38)
var(e.kbf06)			
Constant	3.83 ∗ ∗∗	3.31 ∗ ∗∗	2.76 ∗ ∗∗
	(0.57)	(0.32)	(0.27)
var(e.kbf13)			

Constant	1.79 ∗ ∗	−0.00	0.29
	(0.79)	(0.83)	(0.76)
var(e.Maths grade)			
Constant	0.97 ∗ ∗∗	0.93 ∗ ∗∗	1.14 ∗ ∗∗
	(0.06)	(0.04)	(0.04)
var(Gender)			
Constant	0.24 ∗ ∗∗	0.25 ∗ ∗∗	0.25 ∗ ∗∗
	(0.00)	(0.00)	(0.00)
var(Year of birth)			
Constant	9.68 ∗ ∗∗	10.02 ∗ ∗∗	9.71 ∗ ∗∗
	(0.54)	(0.34)	(0.31)
var(Agreeableness)			
Constant	2.56 ∗ ∗	0.76 ∗ ∗∗	0.64 ∗ ∗
	(1.11)	(0.21)	(0.26)
cov(Gender, Year of birth)			
Constant	−0.00		0.10 ∗ ∗
	(0.08)		(0.05)
cov(Gender, Agreeableness)			
Constant	−0.11	−0.08 ∗ ∗∗	−0.06 ∗ ∗
	(0.09)	(0.02)	(0.03)
cov(Year of birth, Agreeableness)			
Constant	−0.34	0.13	−0.04
	(1.01)	(0.26)	(0.24)
cov(Gender, Year of birth)			
Constant	−0.00		
	(0.08)		
N	596	1045	1293

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Weighted data

Table V: SEM for Neuroticism on maths grades 1'not sufficient' to 6'very good', by level of secondary schooling

	(1) Lower	(2) Intermediate	(3) Upper
Maths grade ←			
Gender	0.22 ∗ ∗	0.03	−0.06
	(0.11)	(0.08)	(0.08)
Year of birth	0.02	−0.00	0.00
	(0.03)	(0.01)	(0.01)
Neuroticism	0.06	−0.10 ∗ ∗	−0.04
	(0.09)	(0.05)	(0.05)
Constant	−43.31	11.82	−5.02
	(62.31)	(24.33)	(22.48)
kbf05 ←			
Neuroticism	1.00	1.00	1.00
	.	.	.
Constant	6.47 ∗ ∗∗	5.57 ∗ ∗∗	5.81 ∗ ∗∗
	(0.47)	(0.24)	(0.19)
kbf10 ←			
Neuroticism	1.18 ∗ ∗∗	1.30 ∗ ∗∗	1.18 ∗ ∗∗
	(0.45)	(0.29)	(0.21)
Constant	6.13 ∗ ∗∗	4.69 ∗ ∗∗	4.80 ∗ ∗∗
	(0.48)	(0.29)	(0.21)
kbf15 ←			
Neuroticism	0.68 ∗ ∗	0.76 ∗ ∗∗	0.78 ∗ ∗∗
	(0.32)	(0.19)	(0.14)
Constant	4.70 ∗ ∗∗	3.75 ∗ ∗∗	4.03 ∗ ∗∗
	(0.43)	(0.18)	(0.16)
mean(Gender)			
Constant	0.58 ∗ ∗∗	0.49 ∗ ∗∗	0.47 ∗ ∗∗
	(0.02)	(0.02)	(0.02)
mean(Year of birth)			
Constant	1987.96 ∗ ∗∗	1988.17 ∗ ∗∗	1988.46 ∗ ∗∗
	(0.16)	(0.12)	(0.10)
var(e.kbf05)			
Constant	6.62 ∗ ∗∗	5.86 ∗ ∗∗	5.22 ∗ ∗∗
	(1.04)	(0.66)	(0.58)
var(e.kbf10)			
Constant	5.81 ∗ ∗∗	4.55 ∗ ∗∗	3.90 ∗ ∗∗
	(1.37)	(0.86)	(0.62)
var(e.kbf15)			

Constant	5.35 * **	4.33 * **	4.15 * **
	(0.66)	(0.45)	(0.34)
var(e.Maths grade)			
Constant	0.97 * **	0.91 * **	1.14 * **
	(0.06)	(0.05)	(0.04)
var(Gender)			
Constant	0.24 * **	0.25 * **	0.25 * **
	(0.00)	(0.00)	(0.00)
var(Year of birth)			
Constant	9.70 * **	10.03 * **	9.71 * **
	(0.53)	(0.34)	(0.31)
var(Neuroticism)			
Constant	2.57*	2.12 * **	2.34 * **
	(1.33)	(0.62)	(0.56)
cov(Gender, Year of birth)			
Constant	−0.00	0.03	0.10 * *
	(0.08)	(0.06)	(0.05)
cov(Gender, Neuroticism)			
Constant	−0.12	−0.17 * *	−0.23 * **
	(0.11)	(0.07)	(0.06)
cov(Year of birth, Neuroticism)			
Constant	−2.42 * *	0.61	−0.24
	(1.11)	(0.60)	(0.54)
N	596	1045	1293

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Weighted data

Table W: Cross-Lagged Auto-Regressive SEM (MLMV) for Openness and income, full table

	1
Income 2004 ←	
Years of Education	0.06 ∗ ∗∗
	(0.00)
Gender (1=female)	−0.38 ∗ ∗∗
	(0.02)
Age	0.00 ∗ ∗∗
	(0.00)
Constant	7.15 ∗ ∗∗
	(0.06)
Income 2006-2008 ←	
Income 2004	0.92 ∗ ∗∗
	(0.01)
Openness 2005	−0.00
	(0.01)
Constant	0.59 ∗ ∗∗
	(0.10)
Income 2010-2012 ←	
Income 2006-2008	0.88 ∗ ∗∗
	(0.02)
Openness 2009	−0.00
	(0.01)
Constant	0.99 ∗ ∗∗
	(0.13)
Years of Education ←	
Gender (1=female)	−0.62 ∗ ∗∗
	(0.13)
Age	0.01 ∗ ∗
	(0.00)
Constant	15.00 ∗ ∗∗
	(0.28)
Openness 2005 ←	
Income 2004	0.03
	(0.03)
Openness 2009 ←	
Income 2006-2008	0.01
	(0.02)
Openness 2005	0.75 ∗ ∗∗
	(0.02)

Openness 2013 ←	
Income 2010-2012	$-0.10 * **$
	(0.02)
Openness 2009	$0.05 * **$
	(0.01)
o105	
Openness 2005	1.00
	.
Constant	$4.52 * **$
	(0.21)
o205	
Openness 2005	$1.44 * **$
	(0.02)
Constant	$3.71 * **$
	(0.30)
o305	
Openness 2005	$0.97 * **$
	(0.02)
Constant	$4.62 * **$
	(0.21)
o109	
Openness 2009	1.00
	.
Constant	$4.38 * **$
	(0.22)
o209	
Openness 2009	$1.22 * **$
	(0.02)
Constant	$3.61 * **$
	(0.27)
o309	
Openness 2009	$0.83 * **$
	(0.02)
Constant	$4.47 * **$
	(0.19)
g113	
Openness 2013	1.00
	.
Constant	$6.99 * **$
	(0.14)
g213	
Openness 2013	$1.22 * **$
	(0.03)
Constant	$6.59 * **$
	(0.18)
g313	

Openness 2013	0.56 * **
	(0.02)
Constant	6.27 * **
	(0.08)
mean(Gender (1=female))	
Constant	1.45 * **
	(0.01)
mean(Age)	
Constant	43.56 * **
	(0.14)
	Error variances fixed to 1 for all endogenous variables
var(Gender (1=female))	
Constant	0.26 * **
	(0.00)
var(Age)	
Constant	96.00 * **
	(1.51)
cov(Gender (1=female),Age)	
Constant	−0.18 * *
	(0.08)
N	4700
pseudo R^2	

GSOEP main questionnaire
Robust Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table X: Cross-Lagged Auto-Regressive SEM (MLMV) for Conscientiousness and income, full table

	1
Income 2004 ←	
Years of Education	0.06 * **
	(0.00)
Gender (1=female)	−0.38 * **
	(0.02)
Age	0.00 * **
	(0.00)
Constant	7.15 * **
	(0.06)
Income 2006-2008 ←	
Income 2004	0.92 * **
	(0.01)

Conscientiousness 2005	$-0.02 * **$
	(0.01)
Constant	$0.60 * **$
	(0.10)
Income 2010-2012 ←	
Income 2006-2008	$0.88 * **$
	(0.02)
Conscientiousness 2009	$-0.02 * **$
	(0.01)
Constant	$0.99 * **$
	(0.13)
Years of Education ←	
Gender (1=female)	$-0.62 * **$
	(0.13)
Age	$0.01 * *$
	(0.00)
Constant	$15.00 * **$
	(0.28)
Conscientiousness 2005 ←	
Income 2004	$-0.12 * **$
	(0.02)
Conscientiousness 2009 ←	
Income 2006-2008	-0.01
	(0.02)
Conscientiousness 2005	$0.63 * **$
	(0.02)
Conscientiousness 2013 ←	
Income 2010-2012	-0.02
	(0.02)
Conscientiousness 2009	$0.56 * **$
	(0.02)
g105	
Conscientiousness 2005	1.00
	.
Constant	$7.22 * **$
	(0.19)
g205	
Conscientiousness 2005	$1.25 * **$
	(0.03)
Constant	$6.93 * **$
	(0.23)
g305	

Conscientiousness 2005	0.56 * **
	(0.02)
Constant	6.41 * **
	(0.11)
g109	
Conscientiousness 2009	1.00
	.
Constant	6.89 * **
	(0.18)
g209	
Conscientiousness 2009	1.02 * **
	(0.03)
Constant	6.33 * **
	(0.19)
g309	
Conscientiousness 2009	0.55 * **
	(0.02)
Constant	6.23 * **
	(0.10)
g113	
Conscientiousness 2013	1.00
	.
Constant	6.75 * **
	(0.15)
g213	
Conscientiousness 2013	1.31 * **
	(0.11)
Constant	6.35 * **
	(0.22)
g313	
Conscientiousness 2013	0.98 * **
	(0.03)
Constant	6.35 * **
	(0.15)
mean(Gender (1=female))	
Constant	1.45 * **
	(0.01)
mean(Age)	
Constant	43.56 * **
	(0.14)

	Error variances fixed to 1 for all endogenous variables
var(e.g113)	
Constant	0.51 * **
	(0.04)
var(e.g213)	
Constant	1.57 * **
	(0.07)
var(e.g313)	
Constant	0.73 * **
	(0.04)
var(e.Conscientiousness 2013)	
Constant	0.10 * **
	(0.03)
var(Gender (1=female))	
Constant	0.26 * **
	(0.00)
var(Age)	
Constant	96.00 * **
	(1.51)
cov(Gender (1=female),Age)	
Constant	−0.18 * *
	(0.08)
N	4700
pseudo R^2	

GSOEP main questionnaire
Robust Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table Y: Cross-Lagged Auto-Regressive SEM (MLMV) for Extraversion and income, full table

	1
Income 2004 ←	
Years of Education	0.06 * **
	(0.00)
Gender (1=female)	−0.38 * **
	(0.02)
Age	0.00 * **
	(0.00)
Constant	7.15 * **
	(0.06)
Income 2006-2008 ←	

Income 2004	0.92 * **
	(0.01)
Extraversion 2005 ←	0.00
	(0.01)
Constant	0.60 * **
	(0.10)
Income 2010-2012	
Income 2006-2008	0.88 * **
	(0.02)
Extraversion 2009	0.00
	(0.00)
Constant	0.99 * **
	(0.13)
Years of Education ←	
Gender (1=female)	−0.62 * **
	(0.13)
Age	0.01 * *
	(0.00)
Constant	15.00 * **
	(0.28)
Extraversion 2005 ←	
Income 2004	−0.08 * **
	(0.03)
Extraversion 2009 ←	
Income 2006-2008	−0.05 * *
	(0.02)
Extraversion 2005	0.92 * **
	(0.02)
Extraversion 2013 ←	
Income 2010-2012	−0.02
	(0.02)
Extraversion 2009	0.69 * **
	(0.01)
e105	
Extraversion 2005	1.00
	.
Constant	6.15 * **
	(0.22)
e205	
Extraversion 2005	1.05 * **
	(0.02)
Constant	5.71 * **
	(0.23)
e305	

Extraversion 2005	1.11 ∗ ∗∗
	(0.03)
Constant	4.62 ∗ ∗∗
	(0.25)
e109	
Extraversion 2009	1.00
	.
Constant	6.32 ∗ ∗∗
	(0.25)
e209	
Extraversion 2009	0.84 ∗ ∗∗
	(0.01)
Constant	5.72 ∗ ∗∗
	(0.21)
e309	
Extraversion 2009	0.78 ∗ ∗∗
	(0.02)
Constant	4.65 ∗ ∗∗
	(0.20)
e113	
Extraversion 2013	1.00
	.
Constant	6.30 ∗ ∗∗
	(0.20)
e213	
Extraversion 2013	1.09 ∗ ∗∗
	(0.02)
Constant	5.95 ∗ ∗∗
	(0.22)
e313	
Extraversion 2013	1.07 ∗ ∗∗
	(0.03)
Constant	4.71 ∗ ∗∗
	(0.22)
mean(Gender (1=female))	
Constant	1.45 ∗ ∗∗
	(0.01)
mean(Age)	
Constant	43.56 ∗ ∗∗
	(0.14)
	Error variances fixed to 1 for all endogenous variables
var(e.ex 2013)	
Constant	0.10 ∗ ∗∗
	(0.02)
var(Gender (1=female))	

Constant	$0.26 * **$
	(0.00)
var(Age)	
Constant	$96.00 * **$
	(1.51)
cov(Gender (1=female),Age)	
Constant	$-0.18 * *$
	(0.08)
N	4700
pseudo R^2	

GSOEP main questionnaire
Robust Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table Z: Cross-Lagged Auto-Regressive SEM (MLMV) for Agreeableness and income, full table

	1
Income 2004 ←	
Years of Education	$0.06 * **$
	(0.00)
Gender (1=female)	$-0.38 * **$
	(0.02)
Age	$0.00 * **$
	(0.00)
Constant	$7.15 * **$
	(0.06)
Income 2006-2008 ←	
Income 2004	$0.92 * **$
	(0.01)
Agreeableness 2005	$-0.01*$
	(0.00)
Constant	$0.60 * **$
	(0.10)
Income 2010-2012 ←	
Income 2006-2008	$0.87 * **$
	(0.02)
Agreeableness 2009	$-0.02 * **$
	(0.00)
Constant	$0.98 * **$
	(0.13)
Years of Education ←	

Gender (1=female)	$-0.62**$
	(0.13)
Age	$0.01**$
	(0.00)
Constant	$15.00**$
	(0.28)
Agreeableness 2005 ←	
Income 2004	$-0.27**$
	(0.04)
Agreeableness 2009 ←	
Income 2006-2008	$-0.06*$
	(0.03)
Agreeableness 2005	$0.88**$
	(0.02)
Agreeableness 2013 ←	
Income 2010-2012	$-0.06**$
	(0.03)
Agreeableness 2009	$0.70**$
	(0.01)
s105	
Agreeableness 2005	1.00
	.
Constant	$6.98**$
	(0.30)
s205	
Agreeableness 2005	$0.49**$
	(0.03)
Constant	$6.48**$
	(0.15)
s305	
Agreeableness 2005	$0.53**$
	(0.02)
Constant	$6.85**$
	(0.16)
s109	
Agreeableness 2009	1.00
	.
Constant	$7.00**$
	(0.30)
s209	
Agreeableness 2009	$0.37**$
	(0.02)
Constant	$6.19**$
	(0.12)
s309	

Agreeableness 2009	0.43 ∗ ∗∗
	(0.01)
Constant	6.63 ∗ ∗∗
	(0.14)
s113	
agr 2013	1.00
	.
Constant	6.88 ∗ ∗∗
	(0.28)
s213	
agr 2013	0.36 ∗ ∗∗
	(0.02)
Constant	6.11 ∗ ∗∗
	(0.11)
s313	
agr 2013	0.40 ∗ ∗∗
	(0.01)
Constant	6.54 ∗ ∗∗
	(0.12)
mean(Gender (1=female))	
Constant	1.45 ∗ ∗∗
	(0.01)
mean(Age)	
Constant	43.56 ∗ ∗∗
	(0.14)
	Error variances fixed to 1 for all endogenous variables
var(Gender (1=female))	
Constant	0.26 ∗ ∗∗
	(0.00)
var(Age)	
Constant	96.00 ∗ ∗∗
	(1.51)
cov(Gender (1=female),Age)	
Constant	−0.18 ∗ ∗
	(0.08)
N	4700
pseudo R^2	

GSOEP main questionnaire

Robust Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table : Cross-Lagged Auto-Regressive SEM (MLMV) for Neuroticism and income, full table

	1
Income 2004 ←	
Years of Education	0.06 ∗ ∗∗
	(0.00)
Gender (1=female)	−0.38 ∗ ∗∗
	(0.02)
Age	0.00 ∗ ∗∗
	(0.00)
Constant	7.15 ∗ ∗∗
	(0.06)
Income 2006-2008 ←	
Income 2004	0.92 ∗ ∗∗
	(0.01)
Neuroticism 2005	−0.02 ∗ ∗∗
	(0.01)
Constant	0.59 ∗ ∗∗
	(0.10)
Income 2010-2012 ←	
Income 2006-2008	0.87 ∗ ∗∗
	(0.02)
Neuroticism 2009	−0.01 ∗ ∗
	(0.00)
Constant	0.99 ∗ ∗∗
	(0.13)
Years of Education ←	
Gender (1=female)	−0.62 ∗ ∗∗
	(0.13)
Age	0.01 ∗ ∗
	(0.00)
Constant	15.00 ∗ ∗∗
	(0.28)
Neuroticism 2005 ←	
Income 2004	−0.33 ∗ ∗∗
	(0.03)
Neuroticism 2009 ←	
Income 2006-2008	−0.12 ∗ ∗∗
	(0.03)
Neuroticism 2005	0.84 ∗ ∗∗
	(0.02)
Neuroticism 2013 ←	

Income 2010-2012	−0.05
	(0.04)
Neuroticism 2009 ←	1.08 ∗ ∗
	(0.05)
n105	
Neuroticism 2005	1.00
	.
Constant	7.18 ∗ ∗
	(0.24)
n205	
Neuroticism 2005	1.23 ∗ ∗
	(0.02)
Constant	6.67 ∗ ∗
	(0.29)
n305	
Neuroticism 2005	0.87 ∗ ∗
	(0.02)
Constant	5.58 ∗ ∗
	(0.21)
n109	
Neuroticism 2009	1.00
	.
Constant	7.38 ∗ ∗
	(0.27)
n209	
Neuroticism 2009	0.94 ∗ ∗
	(0.02)
Constant	6.43 ∗ ∗
	(0.25)
n309	
Neuroticism 2009	0.68 ∗ ∗
	(0.02)
Constant	5.57 ∗ ∗
	(0.19)
n113	
Neuroticism 2013	0.61 ∗ ∗
	(0.02)
Constant	6.42 ∗ ∗
	(0.24)
n213	
Neuroticism 2013	0.72 ∗ ∗
	(0.02)
Constant	6.25 ∗ ∗
	(0.27)
n313	
Neuroticism 2013	0.49 ∗ ∗

	(0.02)
Constant	5.20 * **
	(0.19)
mean(Gender (1=female))	
Constant	1.45 * **
	(0.01)
mean(Age)	
Constant	43.56 * **
	(0.14)
	Error variances fixed to 1 for all endogenous variables
var(Gender (1=female))	
Constant	0.26 * **
	(0.00)
var(Age)	
Constant	96.00 * **
	(1.51)
cov(Gender (1=female),Age)	
Constant	−0.18 * *
	(0.08)
N	4700
pseudo R^2	

GSOEP main questionnaire
Robust Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table : Cross-Lagged Auto-Regressive SEM (MLMV) for Neuroticism and income, full table

	1
Income 2004 ←	
Years of Education	0.06 * **
	(0.00)
Gender (1=female)	−0.38 * **
	(0.02)
Age	0.00 * **
	(0.00)
Constant	7.15 * **
	(0.06)
Income 2006-2009 ←	
Income 2004	0.90 * **
	(0.01)
Locus of Control 2005	0.03 * **

	(0.01)
Constant	0.72 ∗ ∗
	(0.10)
Income 2011-2012 ←	
Income 2006-2009	0.83 ∗ ∗
	(0.04)
Locus of Control 2010	0.03 ∗ ∗
	(0.01)
Constant	1.35 ∗ ∗
	(0.32)
Years of Education ←	
Gender (1=female)	−0.62 ∗ ∗
	(0.13)
Age	0.01 ∗ ∗
	(0.00)
Constant	15.00 ∗ ∗
	(0.28)
Locus of Control 2005 ←	
Income 2004	0.28 ∗ ∗
	(0.02)
Locus of Control 2010 ←	
Income 2006-2009	0.09 ∗ ∗
	(0.02)
Locus of Control 2005	0.58 ∗ ∗
	(0.02)
loc105	
Locus of Control 2005	1.00
	.
Constant	3.42 ∗ ∗
	(0.18)
loc205	
Locus of Control 2005	0.96 ∗ ∗
	(0.04)
Constant	2.58 ∗ ∗
	(0.19)
loc305	
Locus of Control 2005	1.22 ∗ ∗
	(0.03)
Constant	2.30 ∗ ∗
	(0.22)
loc405	
Locus of Control 2005	0.05 ∗ ∗
	(0.02)
Constant	5.93 ∗ ∗

	(0.05)
loc505	
Locus of Control 2005	1.08 * **
	(0.03)
Constant	2.42 * **
	(0.20)
loc605	
Locus of Control 2005	0.76 * **
	(0.03)
Constant	1.88 * **
	(0.16)
loc705	
Locus of Control 2005	0.19 * **
	(0.03)
Constant	2.67 * **
	(0.08)
loc805	
Locus of Control 2005	1.03 * **
	(0.02)
Constant	3.26 * **
	(0.19)
loc905	
Locus of Control 2005	1.18 * **
	(0.03)
Constant	2.28 * **
	(0.22)
loc110	
Locus of Control 2010	1.00
	.
Constant	3.47 * **
	(0.19)
loc210	
Locus of Control 2010	0.85 * **
	(0.03)
Constant	3.03 * **
	(0.17)
loc310	
Locus of Control 2010	1.10 * **
	(0.02)
Constant	2.66 * **
	(0.21)
loc410	
Locus of Control 2010	0.05 * *
	(0.02)
Constant	5.78 * **
	(0.05)

loc510	
Locus of Control 2010	0.93 ∗ ∗∗
	(0.03)
Constant	3.07 ∗ ∗∗
	(0.18)
loc610	
Locus of Control 2010	0.62 ∗ ∗∗
	(0.03)
Constant	2.29 ∗ ∗∗
	(0.13)
loc710	
Locus of Control 2010	0.19 ∗ ∗∗
	(0.03)
Constant	2.92 ∗ ∗∗
	(0.07)
loc810	
Locus of Control 2010	0.95 ∗ ∗∗
	(0.02)
Constant	3.52 ∗ ∗∗
	(0.18)
loc910	
Locus of Control 2010	1.12 ∗ ∗∗
	(0.03)
Constant	2.55 ∗ ∗∗
	(0.21)
mean(Gender (1=female))	
Constant	1.45 ∗ ∗∗
	(0.01)
mean(Age)	
Constant	43.56 ∗ ∗∗
	(0.14)
	Error variances fixed to 1 for all endogenous variables
cov(Gender (1=female),Age)	
Constant	−0.18 ∗ ∗
	(0.08)
N	4700
pseudo R^2	

GSOEP main questionnaire

Robust Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table : SEM for the mediation by supportive parenting of the relationship between children's and parent's Locus of Control

	Locus of Control
Supportive parenting ←	
Parental Locus of Control	0.22 ∗ ∗∗
	(0.04)
Children's Locus of Control ←	
Supportive parenting	0.11 ∗ ∗∗
	(0.02)
Parental Locus of Control	0.16 ∗ ∗∗
	(0.03)
pl01 ←	
Parental Locus of Control	1.00
	.
Constant	7.27 ∗ ∗∗
	(0.04)
pl03 ←	
Parental Locus of Control	1.41 ∗ ∗∗
	(0.14)
Constant	5.74 ∗ ∗∗
	(0.05)
pl04 ←	
Parental Locus of Control	0.03
	(0.07)
Constant	4.11 ∗ ∗∗
	(0.05)
pl05 ←	
Parental Locus of Control	0.23 ∗ ∗∗
	(0.05)
Constant	8.41 ∗ ∗∗
	(0.03)
pl06 ←	
Parental Locus of Control	1.23 ∗ ∗∗
	(0.13)
Constant	6.13 ∗ ∗∗
	(0.05)
pl07 ←	
Parental Locus of Control	0.80 ∗ ∗∗
	(0.10)
Constant	4.07 ∗ ∗∗
	(0.05)
pl08 ←	
Parental Locus of Control	0.02
	(0.07)
Constant	3.55 ∗ ∗∗
	(0.04)

pl09 ←	
Parental Locus of Control	1.87 ∗ ∗
	(0.13)
Constant	7.21 ∗ ∗
	(0.05)
psp01 ←	
Supportive parenting	1.00
	.
Constant	6.27 ∗ ∗
	(0.04)
psp02 ←	
Supportive parenting	0.42 ∗ ∗
	(0.04)
Constant	5.30 ∗ ∗
	(0.05)
psp03 ←	
Supportive parenting	1.19 ∗ ∗
	(0.05)
Constant	6.43 ∗ ∗
	(0.05)
psp05 ←	
Supportive parenting	1.29 ∗ ∗
	(0.05)
Constant	6.17 ∗ ∗
	(0.05)
psp04 ←	
Supportive parenting	1.23 ∗ ∗
	(0.04)
Constant	7.11 ∗ ∗
	(0.04)
psp06 ←	
Supportive parenting	1.28 ∗ ∗
	(0.05)
Constant	7.51 ∗ ∗
	(0.05)
psp07 ←	
Supportive parenting	1.29 ∗ ∗
	(0.05)
Constant	5.86 ∗ ∗
	(0.05)
psp08 ←	
Supportive parenting	1.28 ∗ ∗
	(0.05)
Constant	6.11 ∗ ∗
	(0.05)
psp09 ←	

Supportive parenting	1.24 ∗ ∗∗
	(0.04)
Constant	7.57 ∗ ∗∗
	(0.05)
kl01 ←	
Children's Locus of Control	1.00
	.
Constant	7.81 ∗ ∗∗
	(0.05)
kl03 ←	
Children's Locus of Control	1.83 ∗ ∗∗
	(0.27)
Constant	6.48 ∗ ∗∗
	(0.05)
kl04 ←	
Children's Locus of Control	2.58 ∗ ∗∗
	(0.34)
Constant	6.90 ∗ ∗∗
	(0.05)
kl05 ←	
Children's Locus of Control	−0.00
	(0.13)
Constant	7.72 ∗ ∗∗
	(0.05)
kl06 ←	
Children's Locus of Control	2.07 ∗ ∗∗
	(0.31)
Constant	6.20 ∗ ∗∗
	(0.05)
kl07 ←	
Children's Locus of Control	1.44 ∗ ∗∗
	(0.24)
Constant	5.17 ∗ ∗∗
	(0.05)
kl08 ←	
Children's Locus of Control	0.47 ∗ ∗∗
	(0.17)
Constant	4.11 ∗ ∗∗
	(0.05)
kl09 ←	
Children's Locus of Control	2.36 ∗ ∗∗
	(0.28)
Constant	7.51 ∗ ∗∗
	(0.04)
var(e.pl01)	

Constant	3.48 * **
	(0.15)
var(e.pl03)	
Constant	4.68 * **
	(0.21)
var(e.pl04)	
Constant	5.77 * **
	(0.15)
var(e.pl05)	
Constant	2.39 * **
	(0.11)
var(e.pl06)	
Constant	4.15 * **
	(0.16)
var(e.pl07)	
Constant	4.10 * **
	(0.14)
var(e.pl08)	
Constant	3.57 * **
	(0.11)
var(e.pl09)	
Constant	2.01 * **
	(0.22)
var(e.psp01)	
Constant	3.05 * **
	(0.10)
var(e.psp02)	
Constant	5.01 * **
	(0.14)
var(e.psp03)	
Constant	4.71 * **
	(0.16)
var(e.psp05)	
Constant	3.24 * **
	(0.13)
var(e.psp04)	
Constant	2.08 * **
	(0.08)
var(e.psp06)	
Constant	2.33 * **
	(0.10)
var(e.psp07)	
Constant	3.79 * **
	(0.13)
var(e.psp08)	
Constant	3.61 * **

	(0.13)
var(e.psp09)	
Constant	2.55 * **
	(0.11)
var(e.kl01)	
Constant	5.53 * **
	(0.14)
var(e.kl03)	
Constant	4.98 * **
	(0.19)
var(e.kl04)	
Constant	4.07 * **
	(0.20)
var(e.kl05)	
Constant	5.80 * **
	(0.12)
var(e.kl06)	
Constant	5.28 * **
	(0.21)
var(e.kl07)	
Constant	5.34 * **
	(0.18)
var(e.kl08)	
Constant	5.86 * **
	(0.15)
var(e.kl09)	
Constant	3.08 * **
	(0.19)
var(e.Supportive parenting)	
Constant	1.75 * **
	(0.12)
var(e.Children's Locus of Control)	
Constant	0.29 * **
	(0.07)
var(Parental Locus of Control)	
Constant	0.84 * **
	(0.11)
N	3407

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Weighted data

Table : SEM for the mediation by supportive parenting of the relationship between children's and parent's Openness to Experience

	Openness
Supportive parenting ←	
Parental Openness	0.14 * **
	(0.03)
	(0.04)
Children's Openness ←	
Supportive parenting	0.15 * **
Parental Openness	0.26 * **
	(0.05)
pbf04 ←	
Parental Openness	1.00
	.
Constant	5.97 * **
	(0.04)
pbf09 ←	
Parental Openness	1.12 * **
	(0.07)
Constant	5.10 * **
	(0.05)
pbf14 ←	
Parental Openness	1.16 * **
	(0.06)
Constant	6.14 * **
	(0.04)
psp01 ←	
Supportive parenting	1.00
	.
Constant	6.27 * **
	(0.04)
psp02 ←	
Supportive parenting	0.43 * **
	(0.04)
Constant	5.30 * **
	(0.05)
psp03 ←	
Supportive parenting	1.18 * **
	(0.05)
Constant	6.43 * **
	(0.05)
psp05 ←	
Supportive parenting	1.28 * **

	(0.05)
Constant	6.18 * **
	(0.05)
psp04 ←	
Supportive parenting	1.23 * **
	(0.04)
Constant	7.11 * **
	(0.04)
psp06 ←	
Supportive parenting	1.26 * **
	(0.05)
Constant	7.51 * **
	(0.05)
psp07 ←	
Supportive parenting	1.28 * **
	(0.05)
Constant	5.86 * **
	(0.05)
psp08 ←	
Supportive parenting	1.28 * **
	(0.05)
Constant	6.11 * **
	(0.05)
psp09 ←	
Supportive parenting	1.23 * **
	(0.04)
Constant	7.57 * **
	(0.05)
kbf04 ←	
Children's Openness	1.00
	.
Constant	6.48 * **
	(0.06)
kbf09 ←	
Children's Openness	1.27 * **
	(0.16)
Constant	4.77 * **
	(0.09)
kbf14 ←	
Children's Openness	1.21 * **
	(0.14)
Constant	7.12 * **
	(0.07)
var(e.pbf04)	
Constant	1.58 * **
	(0.09)

var(e.pbf09)	
Constant	3.56 * **
	(0.14)
var(e.pbf14)	
Constant	1.63 * **
	(0.11)
var(e.psp01)	
Constant	3.03 * **
	(0.10)
var(e.psp02)	
Constant	5.00 * **
	(0.14)
var(e.psp03)	
Constant	4.71 * **
	(0.16)
var(e.psp05)	
Constant	3.24 * **
	(0.13)
var(e.psp04)	
Constant	2.07 * **
	(0.08)
var(e.psp06)	
Constant	2.38 * **
	(0.10)
var(e.psp07)	
Constant	3.79 * **
	(0.13)
var(e.psp08)	
Constant	3.59 * **
	(0.13)
var(e.psp09)	
Constant	2.55 * **
	(0.11)
var(e.kbf04)	
Constant	3.24 * **
	(0.23)
var(e.kbf09)	
Constant	7.08 * **
	(0.41)
var(e.kbf14)	
Constant	3.93 * **
	(0.29)
var(e.Supportive parenting)	
Constant	1.78 * **
	(0.12)
var(e.Children's Openness)	

Constant	1.20 ∗ ∗∗
	(0.20)
var(Parental Openness)	
Constant	1.31 ∗ ∗∗
	(0.11)
N	3405

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Weighted data

Table : SEM for the mediation by supportive parenting of the relationship between children's and parent's Locus of Control

	Conscientiousness
Supportive parenting ←	
Parental Conscientiousness	$0.18 * **$
	(0.04)
Children's Conscientiousness ←	
Supportive parenting	$0.28 * **$
	(0.05)
Parental Conscientiousness	$0.37 * **$
	(0.08)
pbf01 ←	
Parental Conscientiousness	1.00
	.
Constant	$8.75 * **$
	(0.02)
pbf07 ←	
Parental Conscientiousness	$0.98 * **$
	(0.06)
Constant	$8.14 * **$
	(0.03)
pbf11 ←	
Parental Conscientiousness	$1.09 * **$
	(0.06)
Constant	$8.04 * **$
	(0.03)
psp01 ←	
Supportive parenting	1.00
	.
Constant	$6.27 * **$
	(0.04)
psp02 ←	
Supportive parenting	$0.42 * **$
	(0.04)
Constant	$5.30 * **$
	(0.05)
psp03 ←	
Supportive parenting	$1.18 * **$
	(0.05)
Constant	$6.43 * **$
	(0.05)
psp05 ←	
Supportive parenting	$1.28 * **$

	(0.05)
Constant	6.18 * **
	(0.05)
psp04 ←	
Supportive parenting	1.23 * **
	(0.04)
Constant	7.11 * **
	(0.04)
psp06 ←	
Supportive parenting	1.26 * **
	(0.05)
Constant	7.51 * **
	(0.05)
psp07 ←	
Supportive parenting	1.28 * **
	(0.05)
Constant	5.86 * **
	(0.05)
psp08 ←	
Supportive parenting	1.28 * **
	(0.04)
Constant	6.11 * **
	(0.05)
psp09 ←	
Supportive parenting	1.23 * **
	(0.04)
Constant	7.57 * **
	(0.05)
kbf01 ←	
Children's Conscientiousness	1.00
	.
Constant	7.02 * **
	(0.07)
kbf07 ←	
Children's Conscientiousness	0.70 * **
	(0.06)
Constant	5.10 * **
	(0.09)
kbf11 ←	
Children's Conscientiousness	0.70 * **
	(0.05)
Constant	7.03 * **
	(0.06)
var(e.pbf01)	
Constant	0.55 * **
	(0.05)

var(e.pbf07)	
Constant	2.09 ∗ ∗
	(0.09)
var(e.pbf11)	
Constant	0.87 ∗ ∗
	(0.09)
var(e.psp01)	
Constant	3.03 ∗ ∗
	(0.10)
var(e.psp02)	
Constant	5.00 ∗ ∗
	(0.14)
var(e.psp03)	
Constant	4.73 ∗ ∗
	(0.16)
var(e.psp05)	
Constant	3.24 ∗ ∗
	(0.13)
var(e.psp04)	
Constant	2.07 ∗ ∗
	(0.08)
var(e.psp06)	
Constant	2.35 ∗ ∗
	(0.10)
var(e.psp07)	
Constant	3.79 ∗ ∗
	(0.13)
var(e.psp08)	
Constant	3.61 ∗ ∗
	(0.13)
var(e.psp09)	
Constant	2.54 ∗ ∗
	(0.11)
var(e.kbf01)	
Constant	1.45 ∗ ∗
	(0.27)
var(e.kbf07)	
Constant	6.76 ∗ ∗
	(0.27)
var(e.kbf11)	
Constant	2.27 ∗ ∗
	(0.18)
var(e.Supportive parenting)	
Constant	1.78 ∗ ∗
	(0.12)
var(e.Children's Conscientiousness)	

Constant	3.34 ∗ ∗∗
	(0.33)
var(Parental Conscientiousness)	
Constant	0.81 ∗ ∗∗
	(0.07)
N	3405

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Weighted data

Table : SEM for the mediation by supportive parenting of the relationship between children's and parent's Extraversion

	Extraversion
Supportive parenting ←	
Parental Extraversion	0.07 ∗ ∗
	(0.03)
Children's Extraversion ←	
Supportive parenting	0.20 ∗ ∗∗
	(0.05)
Parental Extraversion	0.38 ∗ ∗∗
	(0.06)
pbf02 ←	
Parental Extraversion	1.00
	.
Constant	7.53 ∗ ∗∗
	(0.03)
pbf08 ←	
Parental Extraversion	1.10 ∗ ∗∗
	(0.07)
Constant	6.78 ∗ ∗∗
	(0.04)
pbf12 ←	
Parental Extraversion	0.60 ∗ ∗∗
	(0.05)
Constant	4.99 ∗ ∗∗
	(0.04)
psp01 ←	
Supportive parenting	1.00
	.
Constant	6.27 ∗ ∗∗
	(0.04)
psp02 ←	
Supportive parenting	0.43 ∗ ∗∗
	(0.04)
Constant	5.30 ∗ ∗∗
	(0.05)
psp03 ←	
Supportive parenting	1.18 ∗ ∗∗
	(0.05)
Constant	6.43 ∗ ∗∗
	(0.05)
psp05 ←	
Supportive parenting	1.29 ∗ ∗∗

	(0.05)
Constant	6.18 * **
	(0.05)
psp04 ←	
Supportive parenting	1.23 * **
	(0.04)
Constant	7.11 * **
	(0.04)
psp06 ←	
Supportive parenting	1.26 * **
	(0.05)
Constant	7.51 * **
	(0.05)
psp07 ←	
Supportive parenting	1.29 * **
	(0.05)
Constant	5.86 * **
	(0.05)
psp08 ←	
Supportive parenting	1.28 * **
	(0.05)
Constant	6.11 * **
	(0.05)
psp09 ←	
Supportive parenting	1.23 * **
	(0.04)
Constant	7.57 * **
	(0.05)
kbf02 ←	
Children's Extraversion	1.00
	.
Constant	7.15 * **
	(0.07)
kbf08 ←	
Children's Extraversion	0.90 * **
	(0.06)
Constant	6.95 * **
	(0.07)
kbf12 ←	
Children's Extraversion	0.85 * **
	(0.05)
Constant	5.33 * **
	(0.09)
var(e.pbf02)	
Constant	0.87 * **

	(0.10)
var(e.pbf08)	
Constant	1.29 * **
	(0.12)
var(e.pbf12)	
Constant	3.20 * **
	(0.10)
var(e.psp01)	
Constant	3.04 * **
	(0.10)
var(e.psp02)	
Constant	4.99 * **
	(0.14)
var(e.psp03)	
Constant	4.72 * **
	(0.16)
var(e.psp05)	
Constant	3.22 * **
	(0.13)
var(e.psp04)	
Constant	2.07 * **
	(0.08)
var(e.psp06)	
Constant	2.37 * **
	(0.10)
var(e.psp07)	
Constant	3.78 * **
	(0.13)
var(e.psp08)	
Constant	3.61 * **
	(0.13)
var(e.psp09)	
Constant	2.56 * **
	(0.11)
var(e.kbf02)	
Constant	1.86 * **
	(0.23)
var(e.kbf08)	
Constant	2.62 * **
	(0.26)
var(e.kbf12)	
Constant	5.66 * **
	(0.28)
var(e.Supportive parenting)	
Constant	1.80 * **
	(0.12)

var(e.Children's Extraversion)	
Constant	3.52 ∗ ∗∗
	(0.29)
var(Parental Extraversion)	
Constant	1.59 ∗ ∗∗
	(0.11)
N	3405

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Weighted data

Table : SEM for the mediation by supportive parenting of the relationship between children's and parent's Agreeableness

	Agreeableness
Supportive parenting ←	
Parental Agreeableness	0.16 ∗ ∗
	(0.04)
Children's Agreeableness ←	
Supportive parenting	0.21 ∗ ∗
	(0.04)
Parental Agreeableness	0.22 ∗ ∗
	(0.06)
pbf03 ←	
Parental Agreeableness	1.00
	.
Constant	6.66 ∗ ∗
	(0.04)
pbf06 ←	
Parental Agreeableness	0.76 ∗ ∗
	(0.05)
Constant	7.49 ∗ ∗
	(0.03)
pbf13 ←	
Parental Agreeableness	1.20 ∗ ∗
	(0.11)
Constant	7.92 ∗ ∗
	(0.03)
psp01 ←	
Supportive parenting	1.00
	.
Constant	6.27 ∗ ∗
	(0.04)
psp02 ←	
Supportive parenting	0.42 ∗ ∗
	(0.04)
Constant	5.30 ∗ ∗
	(0.05)
psp03 ←	
Supportive parenting	1.18 ∗ ∗
	(0.05)
Constant	6.43 ∗ ∗
	(0.05)
psp05 ←	
Supportive parenting	1.28 ∗ ∗

	(0.05)
Constant	6.18 * **
	(0.05)
psp04 ←	
Supportive parenting	1.23 * **
	(0.04)
Constant	7.11 * **
	(0.04)
psp06 ←	
Supportive parenting	1.27 * **
	(0.05)
Constant	7.51 * **
	(0.05)
psp07 ←	
Supportive parenting	1.28 * **
	(0.05)
Constant	5.86 * **
	(0.05)
psp08 ←	
Supportive parenting	1.28 * **
	(0.05)
Constant	6.11 * **
	(0.05)
psp09 ←	
Supportive parenting	1.23 * **
	(0.04)
Constant	7.57 * **
	(0.05)
kbf03 ←	
Children's Agreeableness	1.00
	.
Constant	5.98 * **
	(0.08)
kbf06 ←	
Children's Agreeableness	0.85 * **
	(0.10)
Constant	7.77 * **
	(0.06)
kbf13 ←	
Children's Agreeableness	1.41 * **
	(0.20)
Constant	7.92 * **
	(0.05)
var(e.pbf03)	
Constant	3.14 * **
	(0.14)

var(e.pbf06)	
Constant	2.01 * **
	(0.09)
var(e.pbf13)	
Constant	0.43 * **
	(0.12)
var(e.psp01)	
Constant	3.04 * **
	(0.10)
var(e.psp02)	
Constant	5.00 * **
	(0.14)
var(e.psp03)	
Constant	4.73 * **
	(0.16)
var(e.psp05)	
Constant	3.23 * **
	(0.13)
var(e.psp04)	
Constant	2.07 * **
	(0.08)
var(e.psp06)	
Constant	2.35 * **
	(0.10)
var(e.psp07)	
Constant	3.80 * **
	(0.13)
var(e.psp08)	
Constant	3.61 * **
	(0.13)
var(e.psp09)	
Constant	2.54 * **
	(0.11)
var(e.kbf03)	
Constant	5.91 * **
	(0.27)
var(e.kbf06)	
Constant	3.17 * **
	(0.20)
var(e.kbf13)	
Constant	1.14 * **
	(0.30)
var(e.Supportive parenting)	
Constant	1.78 * **
	(0.12)
var(e.Children's Agreeableness)	

Constant	0.99 ∗ ∗
	(0.19)
var(Parental Agreeableness)	
Constant	0.95 ∗ ∗
	(0.12)
N	3405

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Weighted data

Table : SEM for the mediation by supportive parenting of the relationship between children's and parent's Neuroticism

	Neuroticism
Supportive parenting ←	
Parental Neuroticism	−0.11 ∗ ∗
	(0.04)
Children's Neuroticism ←	
Supportive parenting	−0.13 ∗ ∗
	(0.04)
Parental Neuroticism	0.18 ∗ ∗
	(0.07)
pbf05 ←	
Parental Neuroticism	1.00
	.
Constant	6.19 ∗ ∗
	(0.04)
pbf10 ←	
Parental Neuroticism	1.92 ∗ ∗
	(0.18)
Constant	4.38 ∗ ∗
	(0.04)
pbf15 ←	
Parental Neuroticism	1.05 ∗ ∗
	(0.07)
Constant	4.11 ∗ ∗
	(0.04)
psp01 ←	
Supportive parenting	1.00
	.
Constant	6.27 ∗ ∗
	(0.04)
psp02 ←	
Supportive parenting	0.43 ∗ ∗
	(0.04)
Constant	5.30 ∗ ∗
	(0.05)
psp03 ←	
Supportive parenting	1.18 ∗ ∗
	(0.05)
Constant	6.43 ∗ ∗
	(0.05)
psp05 ←	
Supportive parenting	1.28 ∗ ∗

	(0.05)
Constant	6.18 * **
	(0.05)
psp04 ←	
Supportive parenting	1.23 * **
	(0.04)
Constant	7.11 * **
	(0.04)
psp06 ←	
Supportive parenting	1.26 * **
	(0.05)
Constant	7.51 * **
	(0.05)
psp07 ←	
Supportive parenting	1.29 * **
	(0.05)
Constant	5.86 * **
	(0.05)
psp08 ←	
Supportive parenting	1.28 * **
	(0.05)
Constant	6.11 * **
	(0.05)
psp09 ←	
Supportive parenting	1.23 * **
	(0.04)
Constant	7.57 * **
	(0.05)
kbf05 ←	
Children's Neuroticism	1.00
	.
Constant	5.71 * **
	(0.08)
kbf10 ←	
Children's Neuroticism	1.45 * **
	(0.19)
Constant	4.91 * **
	(0.08)
kbf15 ←	
Children's Neuroticism	0.87 * **
	(0.11)
Constant	4.00 * **
	(0.07)
var(e.pbf05)	
Constant	3.27 * **
	(0.12)

var(e.pbf10)	
Constant	0.96 * **
	(0.26)
var(e.pbf15)	
Constant	2.23 * **
	(0.10)
var(e.psp01)	
Constant	3.04 * **
	(0.10)
var(e.psp02)	
Constant	5.00 * **
	(0.14)
var(e.psp03)	
Constant	4.72 * **
	(0.16)
var(e.psp05)	
Constant	3.23 * **
	(0.13)
var(e.psp04)	
Constant	2.08 * **
	(0.08)
var(e.psp06)	
Constant	2.36 * **
	(0.10)
var(e.psp07)	
Constant	3.79 * **
	(0.13)
var(e.psp08)	
Constant	3.60 * **
	(0.13)
var(e.psp09)	
Constant	2.56 * **
	(0.11)
var(e.kbf05)	
Constant	6.15 * **
	(0.33)
var(e.kbf10)	
Constant	4.14 * **
	(0.55)
var(e.kbf15)	
Constant	4.52 * **
	(0.25)
var(e.Supportive parenting)	
Constant	1.79 * **
	(0.12)
var(e.Children's Neuroticism)	

Constant	1.65 ∗ ∗∗
	(0.29)
var(Parental Neuroticism)	
Constant	0.81 ∗ ∗∗
	(0.10)
N	3405

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Weighted data